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WORLD PETROLEUM

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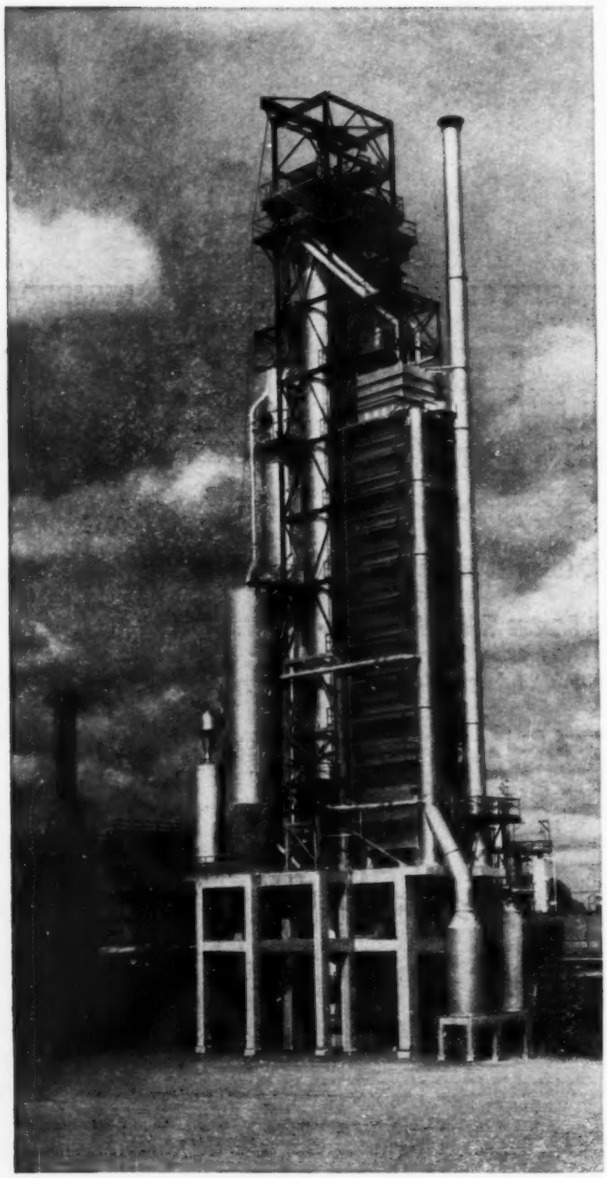
Lion's new TCC unit goes on stream!



On September 16, the sixty-seventh Houdry-licensed cat cracker—and the thirty-eighth T C C—went on stream in the refinery of Lion Oil Company at El Dorado, Arkansas. This unit is of 4,500 bbl. fresh feed capacity, with 900 bbls. additional capacity for recycling.

This new Lion unit will process high-sulfur crude (1.8% in the reactor charge). Corrosion protection is provided by lining the reactor, fractionating tower and all vessels with alloyed steel.

In actual operation, this new T C C unit is running 20% over design capacity, enabling Lion to maintain the high octane quality of its motor gasoline output at considerably reduced costs. And, with built-in recycling, the refiner will be able to vary his product distribution at will, according to seasonal demands.

These are advantages inherent in T C C which have made it the catalytic cracking process outstandingly favored by refineries of relatively moderate size. Details will be furnished gladly to interested refiners.

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EDITORIAL

OIL'S EVER-BROADENING HORIZONS

IN less than nine decades of commercial existence the oil industry has traveled an everchanging and expanding road. In its early days the only product possessing a marketable value that was obtainable from a barrel of crude was kerosene, which gained immediate and growing popularity because it displaced earlier forms of lighting that were even more crude and less satisfactory. Impelled by the push of Yankee enterprise, it developed a worldwide demand that made it an important factor in America's export trade.

To the early refiners the lighter products of distillation were in the main a nuisance. They had to be separated because of the danger involved in attempting to use them in the lamps of the period, a danger emphasized by frequent explosions that resulted in disastrous fires and loss of life. Sometimes they were run off into neighboring streams, but that created a serious fire hazard, and the more general method was to burn them in pits.

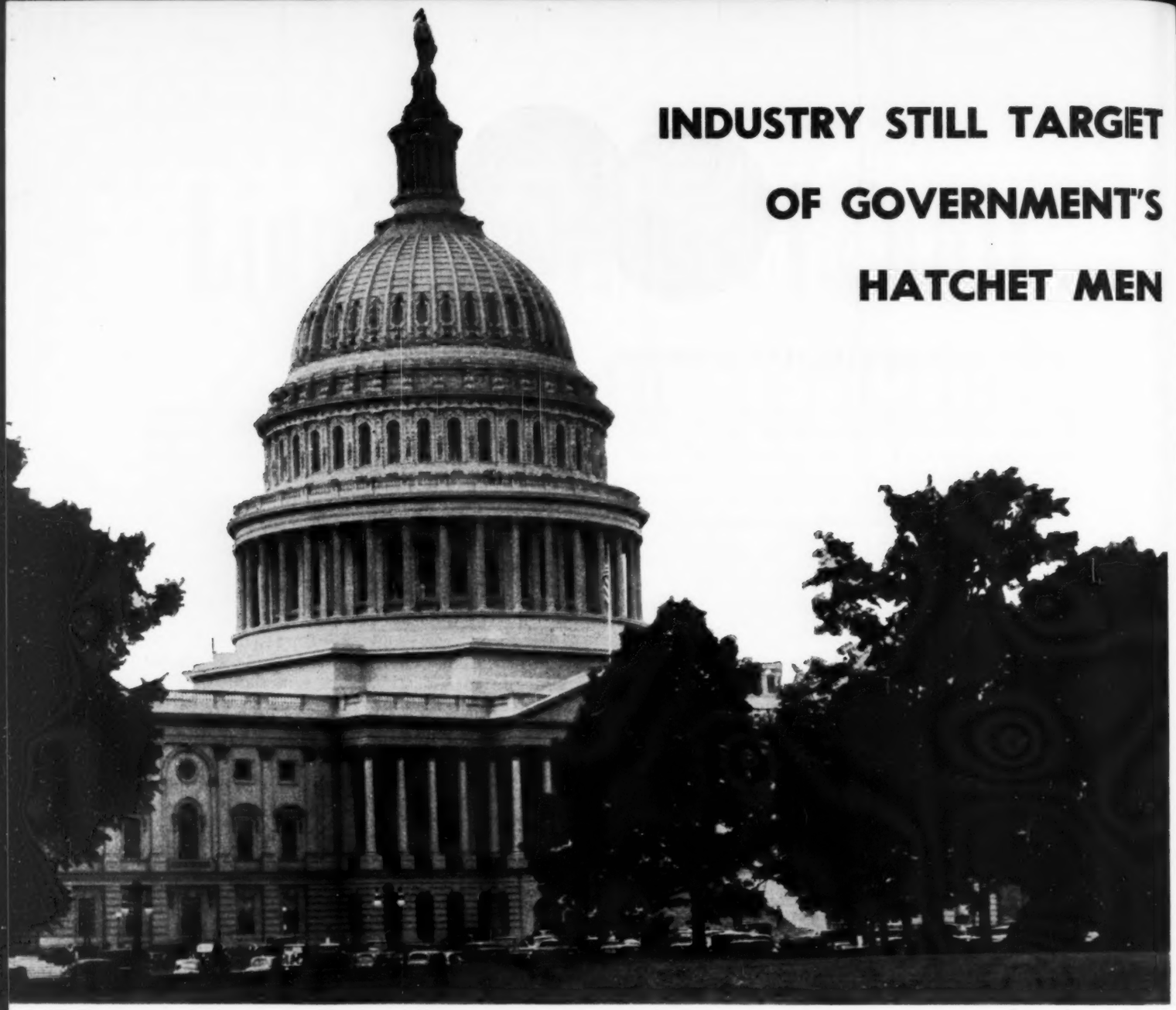
While a limited demand for benzene and naphtha grew up, it was only when the development of the internal combustion engine ushered in the automotive age that the light fractions at the top of the distillation tower began to assume real commercial importance. Thereafter, with the rapid multiplication of horseless vehicles, gasoline gradually replaced kerosene as the money product of the industry. Research and invention were directed to the discovery of methods for converting larger proportions of crude into motor fuel. Except for the astonishing progress made in this direction, it never mould have been possible to maintain the millions of automobiles that now traverse the highways and play such an indispensable part in modern life.

Half a century ago the invention of the diesel engine provided an outlet for the distillate bordering the lower kerosene range, and the rapid growth in the use of diesel power is carrying this product toward one of the top brackets of demand. Demonstration of the advantages of fuel oil for industrial establishments for the propulsion of ships and for domestic heating has conferred upon the whole group of middle and heavy distillates a rating that compares in volume, if not in value, with gasoline. These familiar developments are reviewed merely to illustrate the constantly-changing and enlarging pattern of the oil industry.

World War II brought to the forefront numerous applications of petroleum on which the research divisions of the oil companies had been working for longer or shorter periods, in some cases for a number of years. As a consequence the petroleum industry was able to serve the war needs of the country in vital and spectacular ways. When the sources of natural rubber were shut off it provided a substitute that met critical requirements. It demonstrated its economic utility in the production of the vast quantities of alcohol demanded and provided the toluene and other base materials used in the manufacture of explosives. At the same time, through perfection of new methods of catalytic cracking, it speeded the aircraft of the Allied forces to victory with aviation fuel of the highest quality ever produced. In myriad ways it contributed to the successful outcome of the conflict, not with improvisations but as the result of studies and investigations begun long before the war.

Since the close of the war development has proceeded at an equally rapid pace and appropriations for research and experimentation have risen higher than ever before. The uses found for liquid petroleum gases have elevated these formerly-neglected by-products into an industrial adjunct of huge proportions with demand for butane and propane far outrunning supply. Lack of fats and oils has ceased to be troublesome because of the superior quality of detergents derived from oil. In the chemical field petroleum has shown itself the most efficient source of supply for many widely-used products, while the list of new derivatives serving useful needs is expanding so rapidly that the mere listing of the names would fill more space than this page affords. New and economically practicable methods of obtaining petroleum products from natural gas and coal will soon be in operation. And if one talks to the scientific enthusiasts who are conducting the research activities of the industry, he will learn that in their opinion oil is only at the beginning of its expansion.

Truly no more appropriate slogan ever was coined than that adopted for the industry's publicity campaign. PETROLEUM IS PROGRESSIVE. Its progress is continually opening new vistas of development for this most essential of applied industries. Its ever-broadening horizons indicate that its usefulness to the people of all the world is still far from being fulfilled.



INDUSTRY STILL TARGET OF GOVERNMENT'S HATCHET MEN

THERE was a belief not long ago held by some who attempt to keep up with trends in government that a new "trust busting" era was at hand, with oil as one of the principal points of the assault, and that the signs in the heavns pointed clearly to 1948 as the year of the big drive.

It cannot be said that the signs have entirely disappeared, although they exist largely in the spoken word rather than in concrete action, but it cannot be said, either, that they have become any larger during the current calendar year. That is, no fresh lawsuits have been started against oil companies that were reminiscent of the Medison and the later "Mother Hubbard" cases. The outstanding anti-trust suit in petroleum in recent months was the one filed in the U. S. District Court at Shreveport, La., against the Cotton Valley Operator Committee et al.

In recent months, since the close of the war, in fact, the outstanding petroleum activity of the Department of Justice has been in the real estate end. It has successfully attacked title to tidelands in California and, unless Congress acts, has won for the federal government assets of great value. The Department was briefly active during the past summer on retail prices of petroleum and an investigation appeared to be in the making; there were cryptic remarks from the "spokesmen" that could be construed as promising a big-scale inquiry. A grand jury in the District of Columbia heard testimony for several days from representatives of major suppliers and from local dealers. The inquiry ended abruptly on a note of intimation that it might be resumed later.

The "Mother Hubbard" case, which began with a complaint in the Federal District Court of the District of Columbia, styled United States versus the American Petroleum Institute et al, is still dormant except for the effort made this year by the Sun Oil Company to compel the Department to answer questions, or "interrogatories," which Sun said would serve to define the issues.

The case was filed on September 30, 1940, and is therefore more than seven years old. The original list of defendants numbered 366, of whom 22 were styled "majors," and the other 344 "secondaries." In the leisurely, legalistic motions and maneuvers, rather languid and stylized, and in the extreme age of the action, the affair begins to take on a resemblance to Dickens' case of Jarndyce versus Jarndyce. Defendants have died out of the case, through corporate dissolution and consolidation, although no new ones have been born into it. In all, 141 of the defendants disappeared through dismissal. The Sun Sompany in 1946 submitted some 15 questions; in July, 1946, and in June of the present year, it filed a statement in the court in support of the questions. The Department objected generally to answering and the matter was recently argued in the District of Columbia court.

The Department has shown no inclination to dispose of the case through trial or otherwise. Of course, the war was an understandable ground for delay but now Sun asserts that the Department is pursuing a course which, "if unchecked, will end in something like procedural chaos."

This case and the Cotton Valley suit are the principal activities of the Department of an anti-trust nature directly bearing on the oil industry. Congressional inquiries have turned up nothing outstandingly tangible, although from time to time some broad assertions are made which could constitute a hint to the administration. Senator O'Mahoney of Wyoming, since his party became the minority in Congress, has spoken sharply of concentration in the petroleum industry, a theme which was discussed in the final report of the special committee of which he was chairman during the 79th Congress. That committee was not recreated by the 80th Congress, but a subcommittee of the Senate committee on public lands has largely assumed the same functions as the O'Mahoney committee. Under the chairmanship of Senator George W. Malone of Nevada, rather extensive hearings have been held, and there is indication that they will be resumed some weeks hence. Also in the Senate, the small business committee under Senator Wherry of Nebraska, has held hearings in Chicago, Omaha and Kansas City, and Senator Wherry has made some assertions concerning the evidence adduced in such hearings. He has concluded that the degree of concentration of refining and marketing power in large companies is a subject for alarm. He has not suggested a course of action.

As for the Cotton Valley suit alleging violation of the anti-trust laws, in which 15 corporations and 18 individuals are made defendants, the Department of Justice contends that it is concerned principally with the sale and marketing of the liquid products of this recycling-pressure maintenance-condensate extraction project, one of the largest of its kind in the united states. The complaint, however, does not make the distinction which is claimed entirely clear. The unitization of the properties in the field for operating purposes and the joint venture were effected under the laws of the State of Louisiana and were approved by the state. It has been rumored in the trade that at least one defendant is not unfriendly to the suit. The complaint is broadly drawn, and when it comes to trial—date for which has not been announced—it will clearly be in order to narrow the issue so as not to attack the conservation phases of the operating plan if the asserted purpose of the Department is to be the sole basis of the case. Such assertion was in a press release, not in the complaint. Generally, with respect to anti-trust actions involving the oil industry, the skies are relatively unclouded. It is in another direction entirely that those given to prediction without benefit of Department of Justice guidance see possibilities of great activity, of hand-to-hand fighting in the trenches. It is the so-called tidelands matter.

The United States, through the Department of Justice, won its first bout in the Supreme Court of the United States. The court last June 23 held that the lands below the low-water mark and extending seaward three nautical miles were the property of the United States. Petition for the rehearing was denied by the Court in October. The Attorney General has filed with the Court his form of decree which would make the decision final. As the Attorney General has ruled that there are no applicable laws under which leasing and administration of the tidelands involved can be carried on by a federal agency and that Congress must legislate for these purposes, the developed oil properties on the lands are being operated under state jurisdiction.

The implications of the decision are so great that alarm is spreading to states which have no coastal waters at all. The matter was stated sweepingly by Attorney General Price Daniel of Texas in an address before the Independent Petroleum Association of America in Oklahoma City on September 30, as follows:

"While California tideland oil was the particular aim of the government's first claim in 1937, the case has since been expanded so that today its principle of federal claims and powers extends to all resources within the submerged lands of all states, with the possibility of future application to the uplands and all state and privately-owned property."

Mr. Daniel further said that, "It is no comfort to the inland states that the federal government is not asserting claims to inland waters. They know that for 160 years the government asserted no title to coastal waters. Only the present Attorney General and his predecessar asserted such claim. The next Attorney General may assert the same claim over inland waters, using the California case as a controlling precedent.

It is looked upon as a certainty that other suits of similar nature will be filed. Texas and Lousiana are regarded as being next in line. Both have extensive coastal acreage and much of it is either proved for oil or is being explored. The Court, curiously enough, was intrigued in the California case by the fact of the oil development, and it seemed to accept the theory of a former Secretary of the Interior that under state ownership the oil resources would be selfishly used, while under federal direction they would be of benefit to "all the people."

The implications of the decision are, of course, of less importance than the course of action which may be followed to settle the whole controversy. That course, now urged upon Congress, is the enactment of a resolution which will not only nullify the decision of the court as to California and restore ownership but preclude further action. The question will confront Congress at an early date, to judge from the activity which is being pursued in the states. In Texas a state-wide committee has been appointed by Governor Jester. The several national organizations of state officials are in action. The Interstate Oil Compact Commission has spoken strongly. The issue is being presented in many ways to the people of the states. It is being presented as a matter which may reach far beyond the first "capture" of 3,000 square miles, more or less, of California coastland.

Congress is not unaware of the activity. State delegations are informed. Most of them have been over the ground once. In the 79th Congress a joint resolution was adopted, after extensive hearings by the Judiciary Committees of both branches. The resolution declared that tidelands title had always been in the states, that the United States had no possessive interest therein and that the purpose of the resolution was to renounce all federal interest in the lands. The resolution was vetoed by President Truman. He said it was a matter for the courts.

Like resolutions were introduced again in the 80th Congress. They are before both the Senate and the House and are pending business. Senator Moore of Oklahoma, is chairman of the subcommittee that has been designated to consider the resolution in that body.

As a political question, it should be in a better tactical position that it was in the previous Congress. The Democrats then were the majority party, and it was a Democratic leadership in Congress that went counter to the known views of the admainistration on the tidelands matter. The present minority is made up largely of members who voted for the former resolution. Republican support of the property rights of the states was also greatly in evidence formerly and, as a party question, is counted upon to maintain that attitude. Such a resolution probably would have to be passed over another veto, and there appears to be a reasonable possibility that such an attempt might succeed.

How soon the question will reach the stage of action is the uncertainty now. The "pressure" on members of Congress from the states—probably from nearly all of them—will increase. The oil industry itself is standing by. The issue, important as it is to the industry, has assumed far greater potentialities than ever before as a result of the sweeping nature of the Supreme Court's decision. Coastal states with no oil have shown their concern.

The forces are being mustered. The shot that would send them into action at greater speed than ever before would be the filing of another suit to claim other tidelands. Present reports via the underground are that such suit or suits may not be far off.

In 1870 and for many years thereafter kerosene for lamps was the principal product of petroleum. Lithograph from The Bettman Archive.

Oil — A RESPONSIBLE INDUSTRY

THE oil industry has been preoccupied since the war with a series of knotty problems. Some are of immediate and pressing importance while others deal with the future. Most oil men will agree that the two which merit the most study are:

1. How to meet the extraordinary current demand for petroleum products in every nation so that the disrupted world economy may be most quickly mended.

2. How to assure an adequate future supply of hydrocarbons at a cost which will permit their use by all men.

There are those who have suggested in the past that the oil industry had too little regard for the general welfare. It is true, of course, that competitive producing practices between the two world wars were not always conducive to maximum recovery. But it is just as true that the need for conservation was not as apparent in the days of Oklahoma City and East Texas as it is today . Also it takes time to develop techniques of conservation after the need does develop.

Considering the record of achievement of the industry in World War II and the way in which it has responded to the astonishing growth in post-war demand, there are few, today, who would assert that oil is not an adult industry with a deep sense of responsibility to the public and its employees as well as to its investors.

Most major decisions in all branches of the industry today are largely actuated by the public welfare rather than by competitive advantage. It is not always the most profitable commodity which is being manufactured by today's refiner. It is the one which is most sorely needed. Sales are not concentrated in the most profitable area where transportation costs are lowest. High-cost transportation is undertaken so that all may share available products.

From its historic position as a supplier of energy and heat, the oil industry has broadened its scope until, as a chemical industry, it touches the life of the people in an ever-widening circle. From food crops on the farm to the detergent in the dishpan, oil affects our well-being. Chemical developments have been spectacular in recent years, but from the standpoint of tonnage, oil still is sought mostly for energy and heat.

There is little glamor in the mining of coal. Few youths of spirit and ambition have gone into it for a generation or so unless forced to do so by economics. It is small wonder, then, that post-war Europe is converting to oil as much as supplies and currency permit. The 16 Marshall-Plan countries in Europe, for example, have asked for $2.2 billion in petroleum products from the United States in the next four years. It is small wonder that coal no longer is the fuel propelling ships of commerce or ships of war. It is small wonder that diesels are pulling more railroad trains every day.

There is not much glamor in shoveling coal or carrying out ashes. So it is not surprising that householders who cannot obtain cheap gas for heating are buying oil burners in record numbers—or were until oil companies generally began refusing to accept and mony fuel oil customers. The oil burner salesman in the United States today who does not have a fuel supply contract to offer with the burner is finding himself restricted to replacement deals. Oil companies could sell hundreds of millions of barrels of fuel oil to industry in all parts of the world if they had the oil to sell.

The pressing oil supply problem of today is world-wide in its character and is not based on a lack of oil today but on the lack of steel to dig for it, steel to transport it and steel to refine it. The second and more distant problem of the industry is peculiarily a United States problem stemming from the oiling of two world wars in a quarter of a century and from the accelerated rate at which United States reserves have been discovered and exploited as compared with the reserves of other countries. Secretary of the Interior Krug recently estimated that the United States will be importing 800,000 barrels of oil daily within three years. There are some who thing his estimate far too conservative.

With oil demand at its current level in the United States, it is necessary to find a new oil field with a potential ultimate production of 150 million barrels every month unless national reserves are to be drawn on. The industry's scientists and its wildcatters have never been able to discover oil at such a pace even in "the good old days." After the combing over that favorable areas have been given in the past, it is more and more difficult to make such large discoveries.

Suppose the United States is content to live on its capital. Suppose it draws against its known reserve of 21 billion barrels of oil without going after new reserves. Even then there is a formidable task. The average rate of decline of oil wells in the United States is seven percent. This means that the industry must drill enough new wells in known fields to produce 350,000 barrels of new oil every day. And meanwhile the economists envisage a continued growth in demand for oil at the rate of some five percent yer year.

In the second Cadman memorial lecture before the Institute of Petroleum in London last June, Robert P. Russell, then president of Standard Oil Development Co., told his British audience that almost a third of the 2,456 workers in the company's research and development department then were engaged in seeking the best methods of converting coal and gas to liquid hydrocarbons. "The emphasis placed on this field of research and development is not due basically to any fears of future oil shortage," he said. "Competent oil geologists have estimated that our proved reserves of crude oil will be greater twenty years hence than they are today and that we shall have plenty of oil for the next 100 years. But the time is already at hand, in some parts of the world, when liquid fuels from gas and coal are becoming competitive with petroleum products."

Since Mr. Russell gave his lecture less than six months ago, the tempo of research work on synthetic oil production has been stepped up sharply.

It is said that New Jersey Standard is now devoting 60 percent of its research work to this subject. Gossip filtering out of Pittsburgh where the coal research is centered indicates that success is coming more rapidly than had been hoped for. Rumor has it that the process is being streamlined to eliminate a number of steps which had been considered necessary.

At its recent annual meeting the petroleum division of the American Chemical Society devoted an entire symposium to reports on research into the production of synthetic liquid fuels. One paper even dealt with the possibility of producing liquid hydrocarbons from organic wastes. A brief review of other papers dealing with synthine process research is published in this issue.

To most oil men the immediate problem of supplying enough oil to meet current demand is more real and pressing than the desirability of providing for the distant future. As mentioned previously, the current problem is largely one of steel. There has been criticism in some quarters of the government's action in permitting the export of enough steel to lay the Trans-Arabian Pipe Line. Suggestion was made that the steel should have been kept at home to drill more wells and lay more pipelines. Government action in licensing the export of line pipe was based on the belief that a ton of steel in Arabia would put more oil into world markets than a ton of steel in the United States. Here we cannot drill one well to a square mile and expect it to produce 20,000 barrels of oil or more a day without injury to the oil reservoir. In the United States a far greater amount of drilling would be necessary to get that volume of oil. Despite the steel shortage, drilling in the United States this year will be the greatest in history.

Steel is even more critical in the refining division of the industry than it is in production. Refineries are under construction and reconstruction around the world, but the building of a modern refinery takes so long under current conditions that the real burden must rest on existing plants for another year or more. To meet the situation, refiners are operating their stills at higher than rated capacity in many instances, are prolonging runs as much as possible and shortening turn-around time when stills must finally come down for inspection and repair.

While engaged in its struggle to keep ahead of current demand, the oil refining branch of the industry is expanding its research and development of new products at a far greater pace than ever before. Construction of new research laboratories is being undertaken by virtually every oil company of consequence.

In the meanwhile currently operating laboratories are solving immediate problems such as fuels for the newer aviation motors. The reciprocating engine for most military aviation seems now to be obsolescent, so it becomes essential to have the best type of fuels for jet and turbo-jet motors. Nearly every laboratory in the industry has been working on the problem for many months, and three types of fuel seem to be emerging from the various studies. One type will be required for jet-propelled planes, flying stovepipes and the like; another will be used by turbo-jet units, and still a third fuel will be best for gas turbines which may be used in stationary power plants and in locomotives and ships. It is believed that this general problem is well on the way to solution today.

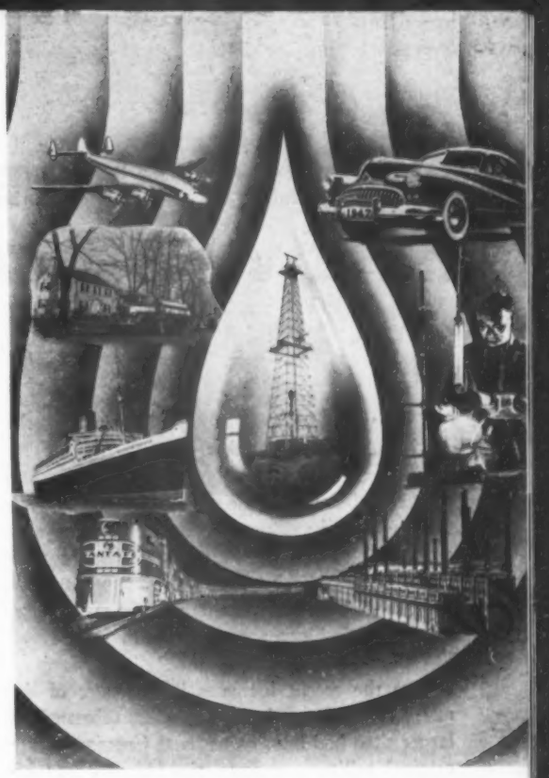
The oil industry is proving to be a substitute source of supply for an increasing number of chemical raw materials for applications where the historic supplier has been unable to meet growing demand. J. Oostermeyer, president of Shell Chemical Corp., recently called attention to this. He showed how the fermentation industries have been unable to keep up with the demand for alcohols, with the result that synthetic alcohols from petroleum are increasing and shortly will be produced as by-products of the synthine process in tremendous quantities.

In the plastics field the coal tar industry has found it impossible to produce enough naphthalene to serve as a source for pthalic anhydride. Oil research has come up with a method of producing the product from gasoline. Another shortage in the coal tar industry is benzene, from which synthetic phenol has been made for plastics and other uses. Dyes, insecticides and nylon all are clamoring for benzene, with the result that no more will be available as a gasoline substitute, and the oil industry will be called upon to produce synthetic benzene.

The shortage of fats and oils during the war and since has limited the supply of soap and given great impetus to the production of detergents. A variety of these are being made from petroleum and will be active competitiors of soap even after the fat shortage has ended because they now can be produced at a competitive price and do a superior job in hard-water areas. Glycerine has been expensive and in short supply as another facet of the soap shortage. But now there is to be plenty of synthetic glycerine from oil. Shell Oil Co. recently ordered 36 new aluminum tank cars to haul its synthetic glycerine to market.

In the field of pest destroyers it now appears that the manufacturers of inorganics will be supplanted by the organics based on petroleum. Another article in this issue on the API farm program is revealing in this direction.

The U. S. Tariff Commission recently reported that 3.3 billion pounds of synthetic organic chemicals were produced from petroleum and natural gas in 1945. This was nine percent of total national production of these chemicals. Great gains have been made since that time.



This month's World Petroleum cover illustrates the expanding horizons of the oil industry which now touch virtually every phase of modern life.

The asphalt branch of the industry has been active in research and the development of new uses for petroleum and natural asphalt to aid mankind. While asphalt tonnage still goes preponderantly into paving operations, it is finding a place in home construction and greater use as a waterproofing material which, after all, was its primary use since the dawn of history.

In the southwest adobe home construction is being speeded and improved by the use of asphalt emulsion as a binder. To build a house in some parts of the southwest, the contractor scrapes off the top soil and then uses the remainder of the earth dug from the basement to mix with asphalt for the walls of the house. The asphalt and earth are combined in a concrete mixer, poured into forms and tamped. As soon as one course is tamped into place, the next course may be added without waiting. Completed walls are finished with gunnite. The homes can be put up quickly and economically. They are cool in summer, warm in winter.

The U. S. Bureau of Reclamation is cooperating in the development of asphalt linings for irrigation canals and ditches to prevent loss of water in arid western regions.

As oil horizons increase year by year through the desire of mankind for greater comforts at home, more food and clothing and wider travel, the responsibilities of the industry increase. Research into new products and new uses creates new demand, which in turn necessitates more research into means of producing more liquid hydrocarbons from nature's petroleum storehouse, from natural gas and from coal.

NPC COMMITTEE STUDIES INCREASE IN GOVERNMENT OIL REQUIREMENTS

THE tight product supply situation in the United States stemming from the lack of refining and transportation capacity has been further complicated by the very large increases in civil and military requirements of the government. A study of the increased requirements was made by the National Petroleum Council's committee on government petroleum requirements at Washington on October 8.

Before the recent increases in estimates of demand, the industry had made offers substantially larger than had been requested. Compared with original military requests, the industry had offered 133.4 percent of the request for aviation gasoline and 131 percent of the request for motor gasoline. In spite of the sudden and drastic increases asked for the remainder of the fiscal year, the industry has offered 99.2 percent of latest aviation gasoline requirements and 95 percent of motor gasoline requests.

After surveying the general situation, the committee made a number of recommendations to the National Petroleum Council which are calculated to improve the current situation. It was recommended that military purchases be centralized and the Bureau of Federal Supply be asked to state in its requests for bids that bidders may offer against any one item or group of items or all items and that such bids will be given equal consideration with all other bids.

The subcommittee reported to the NPC that large additional quantities of 115/145 aviation gasoline will be required in the first half of 1948. The increase is partly in place of 100/130 grade. While motor gasoline offers exceed requirements, military needs for white gasoline between October, 1947, and June, 1948, have been difficult to obtain. The committee stated that off-specification product can be accepted by the government since it is to be used largely as automotive fuel.

The large increases in military requirements estimates as of October 3 compared with the May 28 estimate are shown in Table I.

The sudden and drastic changes in military requirement estimates for gasoline were discussed with representatives of the Army-Navy Petroleum Board. The subcommittee members were advised that the original aviation estimates were based on actual consumption during a recent prior period. However, during this period there were insufficient mechanics available. This

Table I

Military Requirements—Fiscal Year 1948

1000 Bbls.	May 28	Oct. 3	Percent Increase Oct. 3 vs. May 28
Aviation fuels			
115/145 grade	5,224	9,436	80.6%
Other grades	10,275	11,266	9.6
Total aviation	15,499	20,702	33.6%
Motor Gasoline	9,880	13,690	38.6
Other major products	80,243	81,107	1.1
Total major products	104,622	115,499	10.4%

situation was corrected more rapidly than expected with a resulting increase in aircraft service factor and therefore increased fuel consumption per aircraft. The most recent increases result from changes in operational plans involving additional aircraft in commission. The subcommittee was advised that further increases in motor gasoline and also in other products may occur in the near future.

The aviation gasoline situation for the first half of 1948 is not entirely clear as yet, but the NPC committee on military aircraft fuels productive capacity late in September reported the following comparison of estimated production with military requirements for the entire fiscal year ending June 30, 1948:

Fiscal Year 1948—1000 Barrels

	Military Requirements	Forecast—Supplies to Military
115/145 Grade	9,436 (a)	3,706
100/130 Grade	6,914	11,999
Total	16,350	15,705 (b)

(a) The amount of 115/145 for which substitution of of 100/130 grade cannot be considered is approximately 5000.

(b) It should be recognized that this forecast was made at a time when the stated requirements for these two grades was 15,574.

The report shows that 7,575 bbls. of alkylate (28% of production) was planned for diversion to motor gasoline, the remainder being planned for blending with military and civilian aviation. If the full desired amount of 115/145 grade is to be furnished in the future, it would appear that practically all planned alkylate production must be blended into aviation gasoline. (It is recognized that some alkylate may not be suitable for aviation blending.)

Six companies already plan to blend all alkylate production in aviation during the fiscal year. Five companies plan on blending 74 percent or more in aviation, and four companies less than 50 percent in aviation, and three have planned to blend all alkylate production into motor gasoline.

The new requirements indicate a need for changes in plans in which 115/145 grade should be produced wherever possible. While substitution of 100/130 can be made to some extent, the minimum of 115/145 requirements of 3,312 bbls. in the last half cannot be met without change in plans, and added offers of this grade in preference to 100/130 grade are required.

As is the case in the civilian market, the products required are not always available where wanted and transportation difficulties are encountered. This is particularly true with respect to supplies of aviation gasoline on the West Coast and inland. The NPC committee suggested that it probably will be necessary to ship 115/145 aviation gasoline from the Gulf Coast to the Pacific and inland. While there was a severe shortage of offers on kerosene in the first six months of the fiscal year on the Pacific Coast, offers now exceed demand for the October-December period, suggestion that supply and demand for the fiscal year may balance out.

Navy diesel fuel supplies are short in all areas, and Navy fuel oil is short in all areas except California. In the Gulf-East Coast-Caribbean area Navy diesel fuel offers are only 43 percent of requirements currently. An additional 2.5 million barrels are needed in the last quarter. Navy special fuel oil offers are 3.8 million barrels or 49 percent short of requirements and No. 6 fuel is 821,000 barrels short.

Lubricating oil for the military also is short. April 30 bid openings yielded only about half of requirements leaving a shortage of 2.5 million gallons.

Requirements of the Army Air Forces for avlubes are currently being supplied from wartime excess stocks and by refining used oil. However, by the spring of 1948 these stocks will be depleted in most areas and purchases from industry will be necessary. These purchase requirements will average 50 percent in excess of those of the Navy. The combined military requirements for avlubes will then approximate 16 million gallons annually.

Current offerings by industry to the Navy are short of current requirements and large AAF requirements will occur within about six months, after stocks are depleted.

Wm. R. Boyd, Jr., A.P.I. President

B. L. Majewski, Marketing Vice Pres.

J. L. Hamon, Production Vice Pres.

API BROADENS FIELD OF ACTIVITY

THE scope of activity of the American Petroleum Institute has been broadened during the past year in a number of directions. Outstanding are the organization and development of the public relations campaign, activation of the marketing division, reorganization of the transportation division and development of the agricultural development committee.

The public relations campaign has been feeling its way during its first year which may be considered somewhat experimental. A by-product of the campaign is a new sense of industry solidarity which seems to be growing up among oil men. Producers, refiners and marketers seem to have a new feeling of belonging to an institution. There is a growing feeling of pride in being a member of an industry which has served the world so well in war and in peace. Both the public relations and the agricultural development programs are discussed in more detail elsewhere in this issue.

There has been a new emphasis on marketing throughout the industry in 1947, largely because of the critical supply problem created by the unexpectedly large increase in demand so early after the close of the war. It is quite fitting, therefore, that the Institute should have reactivated the division after de-emphasizing that branch of the industry while the nation was at war.

The reactivation of the marketing division under the direction of B. L. Majewski, vice president of Deep Rock Oil Corp., as chairman was undertaken at a general committee meeting held at French Lick, Indiana, April 1-2, 1947. Mr. Majewski announced that the activities of the division were to be directed toward developing a program of service for all marketers, of making its meetings an open forum for all marketers regardless of whether they were members of the division or not, and of inviting the press so that those not able to attend might be fully informed. Several hundred attended this first meeting, and subsequent gatherings also were well attended, 600 being present at the June 30 meeting at Minneapolis.

In order to provide a service center for the division, the Institute in February appointed John W. Frey as director. Dr. Frey brought with him a long experience in petroleum work in the government, a wide acquaintance with marketers

B. Brewster Jennings, Transportation Vice Pres.

L. S. Wescoat, A.P.I. Treasurer

R. E. Wilson, Refining Vice Pres.

Officers of the Seminole, Okla., chapter are: F. J. Wilbanks, chairman; Clyde J. Randles and James F. McDonald, vice chairmen; and M. W. Curtis, secretary-treasurer.

Officers of the Los Angeles Basin A.P.I. Chapter: Ray Webb, acting secretary and treasurer; Lewis R. Rogers, chairman, and Homer O. Woodruff, vice chairman.

of all sizes and an objectivity that keeps him out of factional rivalry and, at the same time, a sympathetic understanding of marketing problems. During the year he has spoken about the aims of the division at state and regional associations in Illinois, Indiana, Michigan, Pennsylvania, Tennessee, New York and New England. His desire is to help make the division a real service bureau for marketers and to coordinate the work of the Institute at a national level with that done by other marketing organizations.

The lubrication committee, which is part of the division, under the chairmanship of H. P. Hobart, vice president of Gulf Oil Corp., has held meetings in New York, Los Angeles and Atlantic City. This committee has made several valuable studies concerning crankcase and chassis lubrication that will soon be made available to the public.

The general committee began the year with a membership of 50, but, to provide for wider representation of all classes of marketers in all areas, directors of the Institute authorized an increase to 65. Apropos of membership on committees, a significant fact not generally known is that all marketing committee members are not members of the Institute. However, it is one of the aims to increase the membership of the marketing division through recognition of the service performed until it becomes a completely representative national group, both regionally and by types.

The division of refining under Institute Vice President Robert E. Wilson of Standard of Indiana and Director W. T. Gunn has continued its many-sided activity during the past year as it has for many years. Technical advances were reported on at the midyear meeting at St. Louis which was a resumption of an activity which had been interrupted by the war. Meanwhile the large number of committees dealing with the problems of modern refining have been busy throughout the year.

One of the most important and widespread activities of the American Petroleum Institute is one of the least known and understood, except to those who are actively engaged in it. The latter are the 3,000-odd members of the fifteen API chapters of the division of production. These are the men who produce the oil that the rest of the industry transports. refines and markets.

Each chapter is a self-governing organization. It adopts its own constitution and by-laws, sets its own meeting dates and decides its own activities and programs. The main purpose of the chapters is to provide an open forum for the discussion of local problems, production methods and the like. Membership is open to those engaged in drilling, production or the manufacture of natural gasoline.

Commenting on chapter activities recently, W. R. Boyd, Jr., president of the Institute, said: "API production chapters have acted as the advance guard in many of the Institute's most worthwhile activities. Their work in connection with vocational training, community relations, standardization and many other fields of endeavor has been of inestimable value to the entire industry. The chapters have ever been willing to take on any activity they deemed of benefit to petroleum and to the communities in which they are located. In so doing they have earned the gratitude of all of us."

While technical discussions at chapter meetings are of primary interest to the members, the scope of their interests and activities is not limited to the science of oil production. They assist school authorities in organizing vocational training classes; they seek more cordial relationships with local business and civic organizations, and, in general, act as the industry's agents of good will in the far-flung areas where oil is produced. Many of the chapters have heard talks on the Institute's public relations program in the past several months and all have reported lively discussions on how best to reach the objectives of the program.

Chapter meetings are interesting and informative get-togethers and a perusal of their programs reveals the wide range of their interests. In addition to many technical discussions on various phases of oil drilling and production, tion, chapter members this year have heard talks and viewed motion pictures on such unrelated

William Schultz, chairman of the Michigan A.P.I. Chapter.

J. U. Teague, chairman of the Houston, Texas, Chapter.

E. J. Jennings, Jr., who won the Houston A.P.I. Chapter's annual scholarship award for engineer students at Rice Institute.

topics as "Atomic Energy," "South American Oil," "Football Highlights," "Economics and the Oil Business," "Education and Investment in People," "Modern Lighting Methods," "Copper and its Alloys," "Pottery Making," "Fishing in the Gulf," and "History of Oil and Gas Law," to mention only a few.

The chapters are the particular "baby" of Carl A. Young, director of production for the Institute. He fathered them, has encouraged them and takes pride in the fine record they have made and the varied activities in which they engage. The first chapters were formed in 1929, in Oklahoma, Kansas, Texas and Arkansas. The first chapter on the Pacific Coast was formed in 1930 in the San Joaquin Valley. This was the first chapter to prepare a formal constitution and by-laws, which has been adopted as a model for all chapters since organized.

There are now fifteen chapters, the newest having been organized in the Permian Basin earlier this year. The chapters tie in closely with the district committees of which they are a part, the whole being under the direction of the central committee on district activities. Present chapter and their officers are:

San Joaquin Valley Chapter: Chairman K. E. Grigsby, The Norwalk Co., Maricopa; 1st Vice Chairman D. G. Kingman, General Pet. Corp., Taft; 2nd Vice Chairman R. M. Miller, The Ohio Oil Co., Bakersfield; Advisor A. B. Newby, Southern Calif. Gas Co., Taft; and Secy-Treas. P. J. Craner, Standard Oil Co., of Calif., Taft.

Los Angeles Basin Chapter: Chairman L. R. Rogers, Superior Oil Co., Torrance; Vice Chairman H. O. Woodruff, The Texas Co., Long Beach; Secy-Treas. Ward B. Tennis, International Cementers, Long Beach; and Asst. Secy-Treas. E. Ray Webb, Sperry-Sun Well Survey, Long Beach.

Coalinga-Kettleman Chapter: Chairman Walter Boice, Western States Gasoline Co., Avenal; 1st Vice Chairman C. S. Morris, Tretolite Co., Coalinga; 2nd Vice Chairman Frank Wilde, Kettleman North Dome Assoc., Avenal; and Secy-Treas. John Van Deventer, Coalinga.

Coastal Chapter: Chairman R. L. Patton, The Texas Co., Santa Paula; 1st Vice Chairman T. H. Rogers, Chanslor-Canfield Midway Oil Co., Ventura; 2nd Vice Chairman Benton Turner, Lloyd Corp., Ventura; Secy-Treas. M. J. Dees, Lloyd Corp., Ventura; Asst. Secy-Treas. Frank Hall, Republic Supply Co., Ventura.

Illinois Basin Chapter: Chairman H. F. Sackett, Evansville; 1st Vice Chairman J. A. McCutchin, Sohio Petroleum Co., Mt. Vernon; 2nd Vice Chairman Ed Stapp, Bell Brothers, Robinson; and Secy-Treas. H. W. Bodkin, Superior Oil Co., Evansville.

Michigan Chapter: Chairman William Schultz, Cities Service Oil Co., Mt. Pleasant; 1st Vice Chairman Olen E. McAlester, Sun Oil Co., Mt. Pleasant; 2nd Vice Chairman Lester LeFavour, Gulf Refining Co., Mt. Pleasant; and Secy-Treas. Earl G. Hartman, The Gordon Oil Co., Mt. Pleasant.

Seminole Oklahoma Chapter: Chairman F. J. Wilbanks, Hinderliter Tool Co., Seminole; 1st Vice Chairman Clyde J. Randles, The Carter Oil Co., Seminole; 2nd Vice Chairman James F. McDonald, Gulf Oil Corp., Seminole; and Secy-Treas. M. W. Curtis, Mid-Continent Petroleum Corp., Seminole.

Drumright Oklahoma Chapter: Chairman V. J. Preston, Continental Supply Co., Drumright; 1st Vice Chairman J. H. Sidwell, Sinclair-Prairie Oil Co., Drumright; and 2nd Vice Chairman and Acting Secy-Treas. P. A. Meyer, The National Supply Co., Drumright.

Panhandle Chapter (Pampa, Texas): Chairman D. J. Gribbon, The Texas Co., Pampa; 1st Vice Chairman F. F. Kennedy, Stanolind Oil & Gas Co., Pampa; 2nd Vice Chairman Ralph W. O'Neill, Phillips Petroleum Co., Phillips; and Secy-Treas. C. A. Husted, Jeffries Trucking Co., Pampa.

Central Oklahoma Chapter: Chairman J. H. Field, Sohio Pet. Co., Oklahoma City; 1st Vice Chairman D. L. Dooley, Stanolind Oil & Gas Co., Oklahoma City; 2nd Vice Chairman F. M. Carroll, Shell Oil Co., Inc., Oklahoma City; Secy. S. H. King, Lane Wells Co., Oklahoma City; and Treasurer S. I. Betzer, Philips Petroleum Co., Oklahoma City.

H. L. Kirkpatrick, chairman of the Ark-La-Tex Chapter, Shreveport, La.

North Texas Chapter: Chairman K. B. Davidson, Humble Oil & Refg. Co., Wichita Falls; Vice Chairmen E. S. Pennybaker, Humble Oil & Refg. Co., Vernon, I. E. Curtis, Tide Water Assoc. Oil Co., Kamay, Paul Peters, The Texas Co., Nocona, Roland Gouldy, Bridwell Oil Co., Wichita Falls, and Fred M. Griswald, Reno Oil Co., Wichita Falls; and Secy-Treas. R. G. Mallander, Shell Oil Co., Inc., Wichita Falls.

East Texas Chapter: Chairman J. N. Miles, Cities Service Oil Co., Gladewater; Vice Chairmen L. H. Dial, East Texas Salt Water Disposal Co., Kilgore, T. C. Frick, The Atlantic Refg. Co., Greggton, and M. E. Zoller, Central Comm. Co., Kilgore; Secy-Treas. Phil J. Lehnhard, East Texas Engr. Assoc., Kilgore; and Asst. Secy-Treas. O. J. Wade, East Texas Engr. Assoc., Kilgore.

Houston Texas Chapter: Chairman J. U. Teague, Hogg Oil Co., Houston; 1st Vice Chairman John Neal, Lane Wells Co., Houston; 2nd Vice Chairman Tucker Pennington, Humble Oil & Refg. Co., Houston; and Secy-Treas. Orien W. Van Dyke, Magnet Cove Barium Corp., Houston 5.

Ark-La-Tex Chapter: Chairman H. L. Kirk-

(Continued on page 124)

Officers of the newly organized Permian Basin Chapter: D. A. Miller, chairman; R. B. Saxe, F. R. Lovering and J. M. Dunlavey, vice chairmen; Jay Boxell, secretary-treasurer; C. C. Roripaugh, publicity chairman; M. R. Hayes, entertainment chairman; M. M. Conn, Arrangements, chairman.

Franklyn Waltman of Sun Oil Co., chairman of the Public Relations Operating Committee.

Entrance to the oil industry exhibits at the Texas State Fair at Dallas.

A. P. I. PUBLIC RELATIONS PROGRAM FOLLOWS DECENTRALIZED PLAN

PLANTED early this year, the seed of the public relations program for the petroleum industry has taken root and is producing a healthy plant. Its branches are spreading over an ever-widening area.

Under the decentralized plan of operation set up for the program, the operation has become industry wide in fact as well as in name. Participation by companies, trade associations and others has multiplied steadily, and more than 1,000 companies and 40 trade associations are actively supporting the program. In this particiation the program is probably unprecedented in industrial public relations. The petroleum program is being carried out by the active and original cooperation on the part of individual industry units.

Millions, in and out of the industry, are daily learning the facts of this progressive industry under the plan set up whereby the action is at community levels with the guidance and counsel of the twelve district committees established throughout the country.

The result has been that the direct investment in the program has been multiplied many times by the action of companies and other industry units. At the same time, the industry has gained an ever-growing sense of participation.

To accomplish this participation, primary efforts during the early part of the past year were devoted to the establishment of the nationwide organization that would give expression to the competitive nature of the industry and acquaint the industry with its public relations problems. The result has been that the program has now swung into action with more than 2,200 industry leaders serving on committees across the country to guide and stimulate the work.

The result has been a snowballing of activity in the form of local programs, company tie-in advertising, radio programs, industrial motion pictures, literature distribution and special promotions that range from exhibits to the distribution of souvenirs carrying the program theme, or a float in a community rodeo parade. More than 1,700,000 pieces of editorial material had been distributed by industry units, large and small, up to a few days ago. In addition, under the supervision of local committees, speakers' bureaus have been set up in virtually every district to carry the story of the industry to civic and other organizations.

Here are a few specific examples of reaction to the program and how it has been translated into effective action by companies in the industry: The executive committee of one large company has recommended the use of all material available, and in addition it is using commercials on its sponsored football broadcasts this fall.

Voting complete approval of the program and all material, the vice president of another company urged supervisory personnel to participate, while company after company, both large and small, has ordered thousands of pieces of literature for distribution.

Employees have been invited to take part in the program by special meetings and through company publications which have been carrying

Arlie Wharton, sales manager of The California Co. tells a group of 100 Standard of Indiana office workers at Denver, Colo., that "There's a Plus for You in Petroleum's Progress."

stories about the program in news and editorial columns in ever-increasing numbers. Supervisors, in other companies, have made definite commitments to learn more and talk more about the industry. Posters and advertising reprints have been placed on bulletin boards; the facts about the industry are being brought to employees in ever greater numbers, with information on competition, conservation, progressive research and many products in which oil plays an important part. Envelope enclosures are being prepared at program headquarters to tell the facts about petroleum companies, in sending out invoices, and for other mailing purposes in reaching the public, and original company booklets are multiplying this effort many times.

An example of cooperation among companies which operate in more than one state is the establishment in the Middle West of a public relations advertising committee of 20 members for the purpose of channeling materials and advertising ideas to companies.

One mid-western company, too, has made an appropriation for a three months' advertising campaign in more than 140 daily and weekly newspapers (mostly Sunday editions), 16 farm papers and several trade magazines with a total circulation of 16 million in fourteen mid-western states. While these advertisements will contain original company copy, the theme of the public relations program will be carried out.

An outstanding example of what a small company has done to tell petroleum's story is that of a products company in the Middle West which, aside from distributing booklets to its 600 employees, prepared a double-page advertisement which was carried in eight trade jonrnals.

As a general rule the industry, countrywide, has been moving into an ever-expanding pattern of participation. Typical of this broadening participation is the move by one large company to insure complete and systematic dissemination of information to company groups. This company has been using the "progressive" theme in its regular advertising, and it is sending out reprints of national advertisements in dealer sales kits monthly. When it decided to augment its effort, management called a special meeting at which board members and department heads were present. After they were acquainted with the progress in the over-all program, plans were discussed to determine how the company could do more to bring the facts to the public. The result was the setting aside of a special fund to purchase editorial material which is to be made available to company branches in the East and Middle West, and three executives were charged with the responsibility of selecting program material for different types of audiences from which company divisions could draw.

These are but a few examples of how the editorial and advertising material is being used. The response by trade associations and allied units too has been significant and is spreading over a wider area.

Within the past month orders for editorial material have been literally pyramiding with approximately 600,000 pieces requested in that period alone.

Indicative of popularity of certain editorial projects prepared at headquarters for this program is the fact that more than 350,000 copies of an employee booklet entitled, "We've Got A Story," have been distributed—the most popular of the pieces thus far produced. Ranking next in appeal was the envelope stuffer, "Most People Amazed at Number of Oil Companies," of which more than 300,000 copies were distributed; another employee leaflet entitled, "Do You Know Bill Burns," was ordered in quantities totaling more than 180,000, and the poster, "Petroleum Promotes Progress," had a distribution of more than 130,000 copies.

A typical example of national trade association support is afforded by one such organization headquartered in the Middle West. An officer in a letter to the association's members noted that the association's board had voted cooperation in the campaign, and he urged members to "tie in and give impetus" to the program.

Allied industry units are also cooperating. On the West Coast a distributor or oilfield supplies became one of the first independently to participate in the program. This distributor has contracted for a five-minute daily radio program, while in Texas a bank recently placed a billboard of the theme, "Petroleum Is Progressive."

Public Relations Steering Committee meeting at Philadelphia where methods were discussed of encouraging oil companies to tie their local advertising into the national plan.

on the highway where it will be seen by 16,000 motorists daily.

In the field of speakers, district committee speakers' bureaus vary from the New York-New Jersey committee of 100 to local units such as one in West Texas which just recently arranged its first public program before the Odessa Rotary Club and Chamber of Commerce.

Special exhibits rank high as means of telling people more about the industry. At the North Montana State Fair, for instance, an estimated 20,000 visitors saw an outstanding company exhibit featuring striking wall maps and charts, and a flow diagram tracing oil from the well to finished products, together with a model refinery. Four companies had displays at the Indiana State Fair, each exihbit using large banners carrying the theme, "Petroleum Promotes Progress." Oil company exhibits at the Colorado State Fair at Pueblo, at the Texas State Fair and other places are further examples of this type of special event.

Playing a conspicuous supporting role in the whole program is the national advertising campaign which made its debut in August with full-color, full-page advertisements stressing the keenly competitive nature of the oil business through the theme, "Understand Rivalry and You Understand America." These advertisement appear in four national publications—*Life, Look, The Saturday Evening Post* and *Collier's*—and reach an estimated reader potential of 58,800,000. Additional support in advertisements has appeared, and will continue to appear, in specialized periodicals and in oil trade papers.

Finally, the advertisements appearing in the national magazines were given additional circulation in a mailing of reprints to 35,000 leaders in business, government and universities throughout the country. Typical of letters received from men to whom these were mailed are a series of excerpts expressing interest in the rivalry theme of the ads.

An official of a large trade association states that "the advertisement impresses me as being an unusually effective translation of the free enterprise philosophy into terms that the average person can readily understand and apply to his own experience. I am confident that this series will not only contribute to a wider public understanding of our economic system and of the oil industry's role in that system, but that the series will also build much public good will for the oil industry."

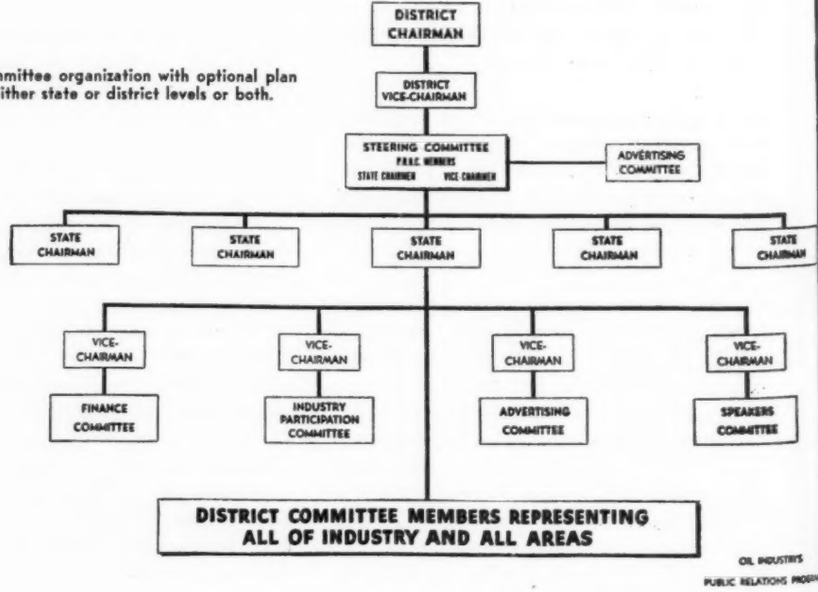
Writes the president of a manufacturing company: "This is a striking advertisement and the copy is interesting. I like it because it is simple and short and gets right into the meat of the subject. * * * I think it is a grand move and a good example of what should be done on a much broader scale by other industries. We have little time to lose to get across to the public through repetitive advertising and educational programs the fact that 'rivalry' is the life-blood of progress in American industry and the American standard of living."

Asserting that he likes the emphasis the advertisement places on friendly rivalry as one of the impelling forces in the free enterprise system the president of a large food products company adds that "it seems strange that the American system has to be explained to Americans, but there is no question that many of our fellow countrymen do not understand what makes our economy tick. It seems to me that the American Petroleum Institute is performing a valuable service to American industry and the American public in instituting this series of advertisements."

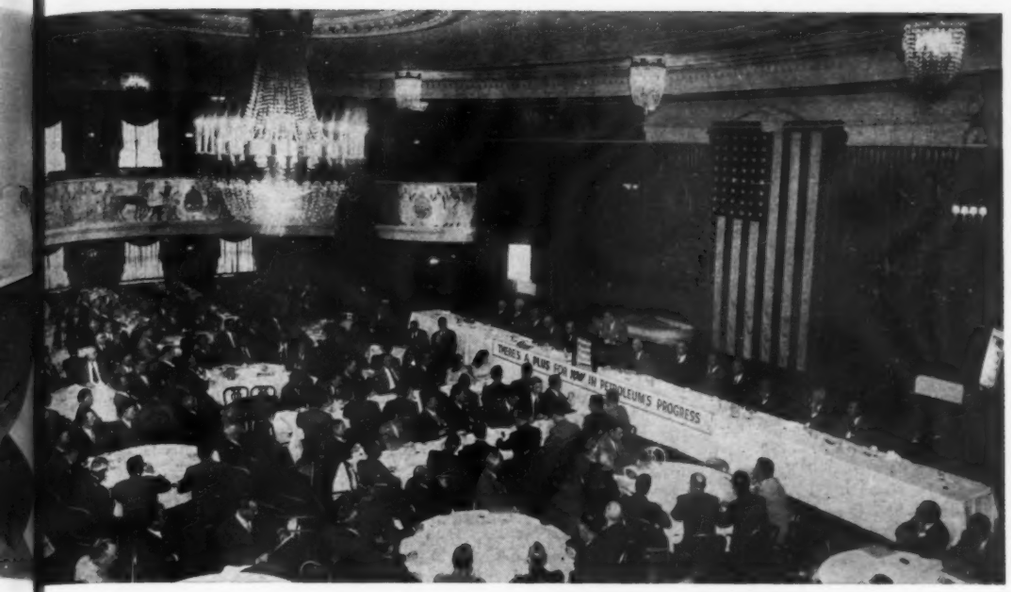
The president of a national publishing firm comments that the advertising message "reminds Americans that the challenges and the rewards of competition are our own common heritage. I was especially pleased with the heading—'Understand Rivalry and You Understand America'—for it could well be the selection for all business."

The statements made by these leaders have been echoed by other men prominent in industry and in other phases of our national life in commenting on the program as a whole.

Only last month an official of an important airlines company praised the industry for setting forth on a program which he said "should have the support of every industry and of commerce in the United States." He added that petroleum is a good example to lead in the movement to



Typical district committee organization with optional plan for advertising at either state or district levels or both.

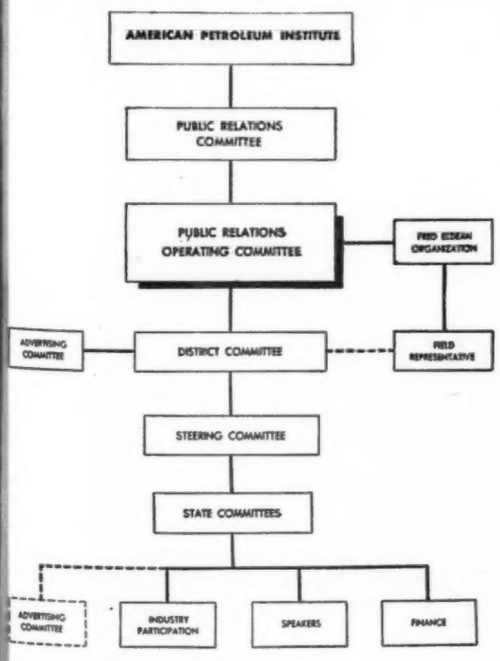


The Chicago Oil Men's Club sponsored a "kick off" luncheon at the Sheraton Hotel on Sept. 25 to promote participation of local oil companies in the public relations campaign.

preserve American standards because of its establishment of maintenance records under all conditions, the broad acceptance of its products, prices and service, and because it is a progressive industry.

Companies and trade associations are trying in their local advertising with the national campaign on a broad scale, utilizing for the purpose a selection of advertisements supplied in two advertising campaign brochures, special ads prepared by thier own advertising departments, product ads with program tie-ins as well as banners and boxes in regular company ads. An indication of the special appeal of this material is the fact that orders have been received for every matrix offered in one of the brochures. Up to a recent date, 2000 mats had been ordered, indicating a potentially tremendous audience.

Chart showing functional positions of public relations units in the national plan.



In setting up the over-all program, an outstanding achievement in the first year's work is the speed with which organization was established to carry out the objectives of the program. The task entailed the establishment of a nationwide organization, embracing all segments of the industry, from key cities to local areas where units, large and small, are translating the program into action.

All this has been accomplished following a nationwide survey conducted for the American Petroleum Institute more than a year ago. That survey showed that the majority of adults in the country were not well informed of the facts concerning the industry's keenly competitive nature, its technological advances, its constant efforts to improve old products and to develop new ones and its vital interest in conservation of the nation's natural resources. It resulted in the organization of a Public Relations Committee of the Institute which, in turn established a subcommittee known as the Public Relations Operating Committee, composed of public relations personnel in the industry.

The Fred Eldean Organization, Inc., was appointed public relations counsel and, functioning with the Public Relations Operating Committee, immediately undertook the task of setting up the nationwide organization to activate the program and to tell the story of the progressive petroleum industry to all segments of the industry and to the public. This involved the setting up of field representatives of the Fred Eldean Organization to counsel and work with twelve district committees established throughout the country and composed of leading oil men from all divisions of the industry. The organization of such committees, as autonomous units, was accomplished with comparative speed.

These committees' primary responsibilities are:

1. To get individual companies in the industry to make the greatest possible use of their facilities for accomplishment of the industry's program;
2. To counsel with and assist all companies in the preparation of plans and materials needed to make their participation in the program effective;
3. To create and take advantage of opportunities to tell the story of the progressive petroleum industry to organized groups and the public at large, and
4. To serve and analyze the public relations opportunities, trends and needs within the district and to make suitable recommendations to the Public Relations Operating Committee.

All commodities, down to the grass roots level, have been designed to represent adequately and properly all petroleum interests in each territory—production, refining, transportation and marketing, as well as independent jobbers and marketers and trade associations.

From issuance of the first campaign brochure, "Winning More Friends for Your Business," last spring the program has experienced a quick acceleration in activity. That brochure explained the reasons for and the objectives of the campaign and contained in addition suggested material for use by industry units in the form of newspaper advertisements, radio commercials, mailing pieces and a plant poster, a fact sheet of the industry's progressive achievements and a 15-minute speech which could be delivered before civic organizations—a complete program in one kit utilizable by large or small companies, with or without public relations departments.

An example of the operation of the program in accord with the autonomous local setup that has been developed was seen recently in the issuance by district committees of a memorandum of information on the supply and demand situation. Used in each district according to the local needs, stories based on the memorandum carrying local comment by industry leaders were carried in the Gulf-Southwest by 80 percent of the daily newspapers. In many communities the memorandum was distributed directly to prominent persons, and bulk shipments were distributed by trade associations to their members to acquaint them with the facts about this question.

With organization on a sound footing, companies solidly behind the program and trade associations offering effective support, the program continues to gain momentum daily. Accomplishments demonstrate that the persistent effort will yield a harvest of increased understanding by all Americans of the oil industry's contribution to progress and to the national welfare.

OIL and FOOD

Modern power farming is illustrated by this potato digger and loader which cuts the cost of harvesting two thirds and time by three fourths. Standard Oil Co. (N. J.) photo.

Petroleum Is to Play an Increasingly Important Part in Food Production Through New Science of "Chemical Farming"

By GEORGE KRIEGER

Agricultural Engineer, Ethyl Corporation; Chairman, Agricultural Development Committee, American Petroleum Institute

THE worldwide shortage of food which competent authorities estimate will continue for another five years has intensified interest during the past year in the activities of the new Agriculture Development Committee of the American Petroleum Institute. Although only a year and a half old, the committee has done a great amount of preliminary work in the investigation of the fields in which oil companies may enlarge their research into modern chemical farming.

The oil industry is helping fight the food shortage today on three fronts. Oil is providing the fuels and lubricants for scientific power farming and thus increasing the productivity of each farm worker. Oil is providing increasing quantities of fertilizer to increase the fertility of each acre under cultivation. Oil is providing numerous organic pesticides to protect crops against their many enemies and thus is helping to increase food production in another manner. In each of these fields there are large, unexplored areas for improvement.

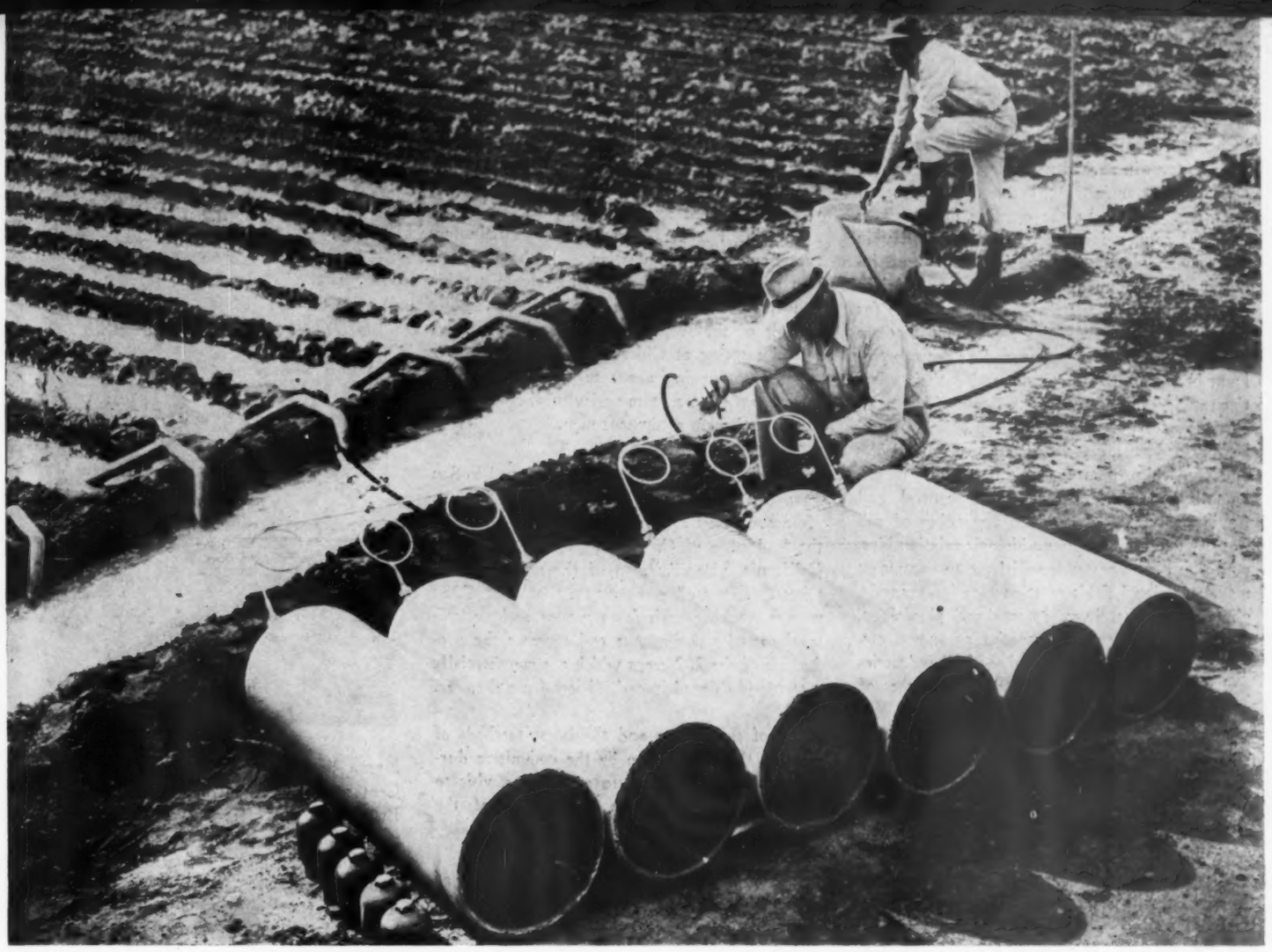
Although the acute phase of the food situation is expected to be alleviated within the next five years, it now appears that the world would eat a great deal more food if it could get it. The United States as well as the rest of the world is capable of consuming a great deal more food than it now produces, even though 1947 will probably set a new peacetime record for tonnage. For example, according to the Corn Belt Farm Dailies, "Government-inspected meat packers produced during the first seven months of 1947, exclusive of lard, 3,327,394,000 pounds of all meat compared with 2,330,427,000 pounds during the same period of 1946. During these same seven months of 1947 this country exported only 171,051,000 pounds against 1,061,174,000 pounds in the first seven months of 1946. Since July meat output has been high and exports low. Yet on September 1 the reserve stocks in storage were amongst the lowest on record. American people ate it all and clamored for more."

From the standpoint of nutrition, the optimum human diet is based primarly on milk, meat, eggs, butter, cheese—the animal product foods—and fresh fruits and vegetables. These are the foods that most people like best and which are best for them. These are the foods that are essential to upgrading the public health through better nutrition.

The Census reports that the population of the United States has increased by more than 11,000,000 people since 1940. It is estimated that if the present rate of increase continues, there will be an additional 15,000,000 people in the United States within the next eight years. It is both possible and probable that the sheer economics invoved in population growth alone will create a trend toward food and fiber shortage as opposed to the so-called surpluses that existed during the early 1930's. In the years immediately ahead the United States will need to expand materially the production of food for its own consumption, exclusive of export.

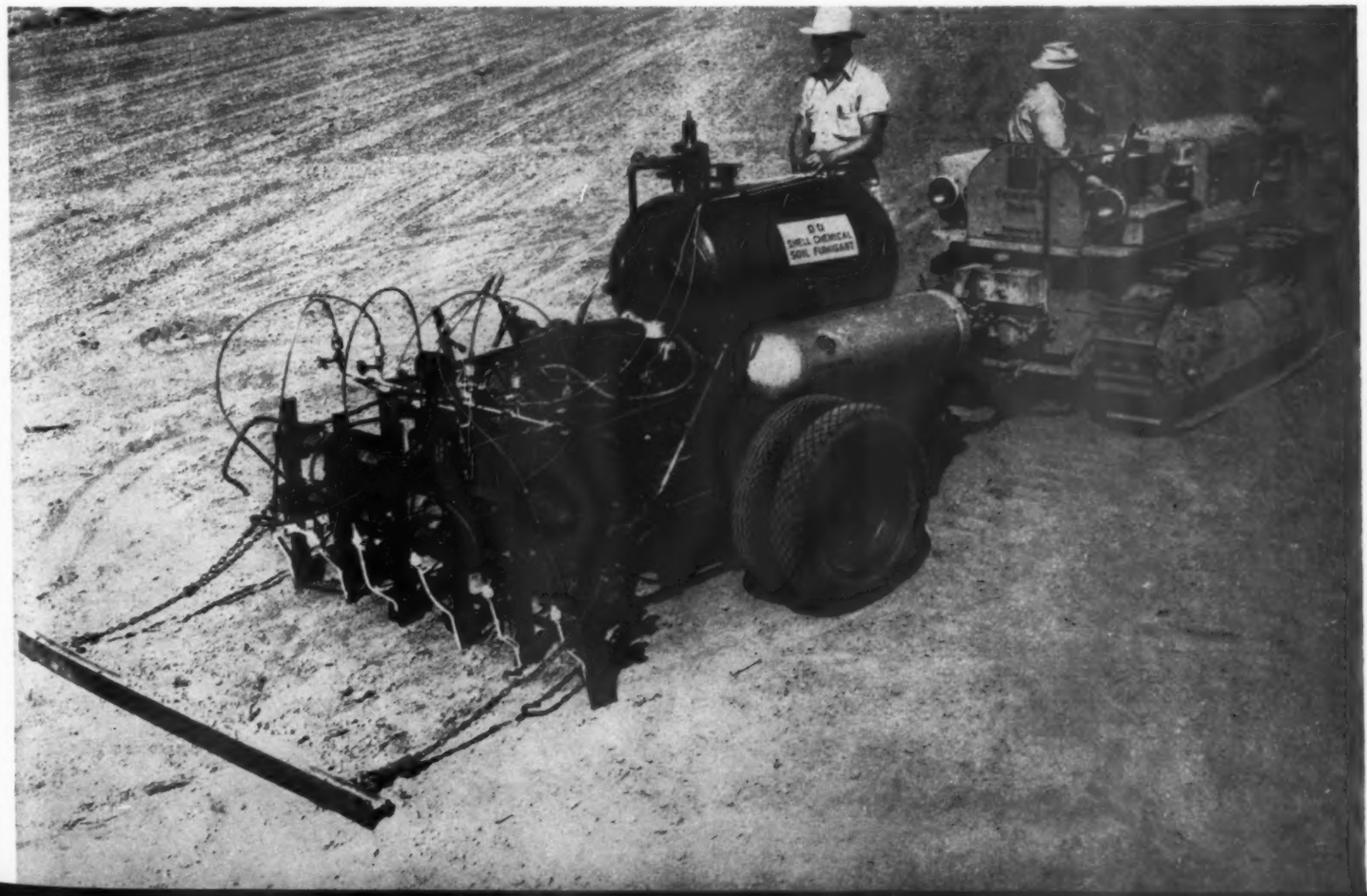
Now comes the question, what can be done about it? Right here is where petroleum and agriculture become even more closely related. Insurance for adequate food, clothing and shelter in the future lies in scientific power farming; by which is meant the same everyday application of economics, chmeistry, physics and engineering to farm practices that general industry utilizes as a matter of routine. Farm mechanization has made tremendous contributions to agricultural progress, especially during the past quarter century. The story of how petroleum provides the fuels and lubricants for almost three million farm tractors is well known. But this is only the beginning.

Chemistry has almost overnight crashed into farming. It is only within the last three years that the potentialities of organic chemicals for agricultural uses have been fully recognized and established. Today the demand for some of these new chemicals such as DDT, 24-D, benzine hexachloride, etc., results in the consumer use being far ahead of the basic knowledge essential to fully effective utilization. However, the new farm practices involved are rapidly progressing from the "invention stage" to the "development stage."



Anhydrous ammonia is applied directly to the irrigation system at a Shell Oil Co. experimental farm as a method of nitrogenation which is being widely used in the west.

Special equipment is being developed for chemical farming. The special machine shown below was developed by Shell for simultaneous application of fertilizer and soil fumigant.



"Chemical farming" is the newest and most significant term in agriculture today. It means the advent of better farming, better food and better nutrition. It marks the opening of vast new fields of service for the petroleum industry in research and in marketing. The petroleum industry will produce many of the raw materials, intermediate chemicals and finished products for chemical farming. Already some companies are testing and screening a thousand or more petroleum chemicals a year to determine their effectiveness for agricultural use. Some of the principal uses for these new petroleum chemicals will be for food preservatives, fertilizers, insecticides and fungicides, plant growth regulators, defoliants, livestock pest control, weed control, soil fumigation, maintenance and upgrading of soil fertility including optimum biologic relationships, etc. Petroleum research will have to encompass many additional fields of science as for example, phytology, nematology, entomology, physiology, toxicology, bio-chemistry, genetics, agronomy, etc. Agriculture is the most complex of all industries and requires the coordination of all branches of science for solutions to its problems.

The job ahead is going to require close cooperation between petroleum scientists and agricultural scientists in the United States Department of Agriculture and in the State Colleges and Agricultural Experiment Stations. As research progresses in this new field of chemical farming, the results will have to be considered qualitatively as well as quantitatively. The value of the end product, food, will depend upon the amount of the total digestible nutrients it contains, not just upon its appearance, size and weight as at present.

The principal function of the Agricultural Development Committee of A.P.I. is to keep abreast of the economic and technical changes occurring in agriculture and to advise the petroleum industry accordingly so that petroleum products and services can keep pace wtih agricultural progress. The committee has outlined as its particular field the discovery of answers to the following questions:

(1) What insects, fungi, weeds and other pests, not now controlled, are causing serious economic losses?

(2) What crops are not being adequately protected?

(3) What weeds need to be eradicated?

(4) What acreage is involved, and where?

(5) What are the potential fields for defoliants and soil fumigants?

(6) What will protection cost, compared with values of increased yield or improved quality resulting from protection?

These questions are suggestive rather than complete, but they should be sufficient to indicate the importance of adequate survey work.

In its preliminary work to discover a proper sphere of activity to aid agriculture, the Agricultural Development Committee has taken counsel with government agriculture experts, university and research leaders, farm equipment manufacturers and farm organizations. At the organization meeting in April, 1946, the committee began its work at Washington by interviewing officials of the Department of Agriculture. A second meeting at Chicago in June, 1946, was devoted to hearing about farm problems from farm paper editors, state agricultural college professors and farm equipment men.

In September, 1946, the committee moved to San Francisco to confer with West Coast leaders. Here a regional committee was organized under the leadership of C. F. Ramey of Standard of California, vice chairman of the national committee. Every oil company on the West Coast now is working with farm groups and agricultural societies to improve and increase the production of the 202 crops which are commercially grown and shipped in carload lots from the area.

Many of these crops and the latest methods of growing them were seen by the committee during a tour of the Modesto area and a visit to the argricultural research laboratories of the Shell Oil Co., Inc.

At the 26th annual meeting of the Institute at Chicago last November the six-month-old committee sponsored the first farm session of the API.

This year the committee has continued its policy of visiting various parts of the country to investigate the areas in which agriculture needs help from the oil industry. At Memphis, Tennessee, in May a southern regional committee was organized under the leadership of Jesse D. Wooten, vice president of the Mid South Oil Co., a large independent distributor. Mr. Wooten is also a vice chairman of the national committee.

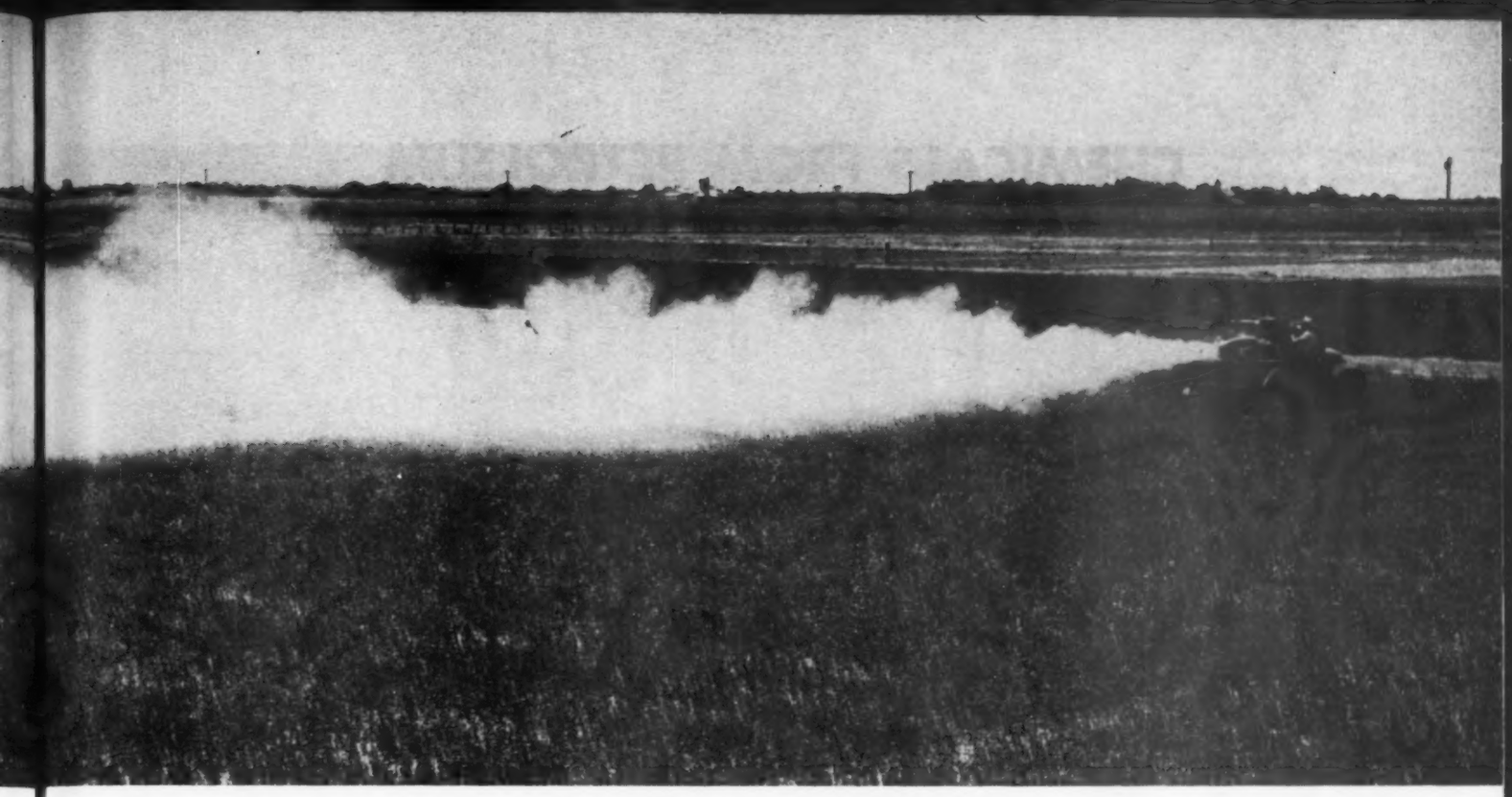
After the meeting the group went out into the field to see what is going on in agricultural research and development in the South. Visits were made to the famous Shelby County, Tenn., penal farm where 7,500 acres are under intensive scientific cultivation and which makes a profit for the county. A day was spent in learning about the new stock development pioneered by the Moore Hereford farm where cotton was abandoned for livestock. At Stoneville, Miss., the committee members saw the cotton mechanization research center, the Delta Experiment station, where they watched flame cultivation of cotton for weed elimination by butane. They went over a 140,000-acre tract which had been treated with anhydrous ammonia produced from petroleum by Lion Oil Company.

In September the committee went back to Washington and visited the Agricultural Research Center of the Department of Agriculture at Beltsville, Md. Here the various researchers explained their various current projects and indicated fields needing early attention. An arrangement was worked out with N. E. Dodd, undersecretary of agriculture, by which oil companies interested in agricultural research can aid the government or obtain aid from the government without red tape.

Under the Hope-Flanagan research and marketing act it is possible for an oil company to send men to any government agricultural research station where they may obtain background material or actually carry on work. They may borrow government researchers or lend men to the government by simply clearing with Arthur W. Turner in charge of the agricultural engineering division of the Department of Agriculture.

One concrete bit of service to agriculture undertaken this year is expected by the committee to be of great value to researchers. The committee has sponsored publication of a monograph by Dr. Frank A. Gilbert of Battelle Memorial Institute, dealing with the mineral nutrition of plants and animals. For three years Dr. Gilbert spent his entire time studying the literature on trace elements and their effect on soil fertility and human nutrition. The book will be published by the University of Oklahoma Press with the API committee backing.

For 1948 the Agricultural Development Committee of the Institute intends to continue its regional meetings to study the needs of agriculture and promote oil industry research. Two meetings are scheduled thus far. In May the



Applying insecticide to a new stand of alfalfa at Shell Oil Company's experimental farm where 100 acres of trees and vines and 30 acres of truck crops also are grown.

committee will meet at Minneapolis where Norman Curtice of Pure Oil Co. will be chairman. Agenda include a visit to farm machinery factories and laboratories and an inspection trip through Minnesota and Wisconsin to visit dairy farms and milk-processing plants. One day will be spent at the University of Wisconsin.

A fall meeting will be held at Denver to study the needs of the mountain states. Frank Wallace of Shamrock Oil & Gas Co., Amarillo, and H. E. Armitage of Frontier Refining Co., Denver, are arranging this meeting.

After eighteen months of study members of the committee believe that chemical farming is destined to be of prime importance in upgrading the public health through better nutrition. Petroleum is an integral part of chemical farming. The Agricultural Development Committee of the American Petroleum Institute will do its best to assist the petroleum industry in continuing to promote the progress of American agriculture. What's good for agriculture is good for the United States and in turn is good for the petroleum industry.

Technical assistants at Shell's Modesto, Calif., experimental farm engaged in plant physiology tests.

Dr. Leon C. Glover, Shell entomologist, testing toxicity of a new chemical on one of the varieties of the darkling ground beetle.

CHEMICALS FROM PETROLEUM

Butadiene plant capable of producing 150,000 tons per year from petroleum.

by E. R. Smoley, R. M. Torrey, & L. Kniel*
The Lummus Company, New York

THE production of synthetic chemicals from petroleum has been rapidly expanding since the early 1930's. From an output of 150,000 pounds of petroleum chemicals (not including aromatics) in 1925, the total production increased to almost four billion pounds in 1946[1]. In the solvents field petroleum and natural gas are source materials for five percent of this country's methanol production, 50 percent of ethanol, 100 percent of isopropyl alcohol, 75 percent of acetone, 35 percent of n-butyl alcohol, 90 percent of amyl alcohol, major part of xylenes and a large part of acetic anhydride[2]. The main reasons for the increasing use of petroleum as a raw material are its economy and abundance, as well as the continuing occurrence of shortages of many of the other previously-used source materials.

This trend continued during the war although there were shifts in product consumption from civilian to war uses. There was also a tremendous expansion in the production of many new war synthetics, such as butadiene, styrene, toluene, cumene, aviation alkylate, plastics and solvents.

About 475,000 tons of butadiene were produced in 1946. Six hundred thousand tons of toluene from petroleum and 15,000 barrels per day of isopropyl benzene (cumene) for rich mixture blending in aviation gasoline were produced in 1944.

Current shortages of older raw materials for synthetics have affected the production of many chemicals such as ethyl alcohol, phthalic anhydride, glycerine and benzene[3]. With increasing prices for grain and shortage of molasses supply, ethyl alcohol has become a critical chemical. This is being relieved by its production in increasing quantities from ethylene obtained from cracking petroleum. Methyl alcohol produced from natural gas, and isopropyl and normal propyl alcohol from petroleum are also helping by substituting for many ethyl alcohol uses. Ortho-xylene, produced from petroleum, is now being used to supplement the inadequate supply of coal tar naphthalene in the manufacture of the rapidly increasing production of phthalic anhydride, with use as a plasticizer in alkyd resins. Glycerine, normally a by-product of soap manufacture, will soon be made commercially in Houston, Texas, from propylene and chlorine. Glycerine has many uses, one being the production of alkyd resins. Another coal tar source material which is falling short of demands is benzene. Sold at 13 cents per gallon in 1937 to 1945, it was quoted at 19 cents per gallon this July and is expected to level off at 23-25 cents per gallon. It does not seem so long ago when coal tar benzene was used in quantities for its anti-knock properties in motor gasoline. The reverse is now close at hand. It now appears that the industry will eventually produce benzene from petroleum for its conversion to styrene, phenol, aniline, chlorobenzene, solvents, nylon, detergents and insecticides.

The lighter hydrocarbons from petroleum and natural gas are the most widely used in the production of chemicals. The olefins are very reactive and are available from petroleum and natural gas in large volumes. Ethylene, propylene and butylenes find large application in the manufacture of plastics, rubber and resin products. The production of ethylene and propylene, roughly in equal proportions, reached over one billion pounds in 1945, indicating the large part played by these source materials in the production of synthetic organic chemicals.

The production of synthetic detergents made from petroleum has now grown from practically

* Presented this paper at the Southwestern Louisiana American Chemical Society Meeting, September 20, 1947, at Lafayette, La.

Azeotropic distillation plant for the production of nitration grade toluene.

nothing before the war to 250 million pounds per year with an estimated 400 million pounds to be manufactured next year. They compete at equal price with soap but show advantages in sudsing in hard water with no scum and with higher wetting power.

The application in the United States of the Fischer-Tropsch reaction for the production of gasoline, diesel oil, alcohols and other oxygenated chemicals from natural gas will cause an enormous increase in synthetic production when the two large plants now under construction—one at Brownsville, Texas, and the other at Hugoton, Kansas—commence operation probably in 1950. These plants are each expected to produce about 5,000 barrels per day of gasoline, about 2,000 barrels per day of diesel fuel and a tremendous volume of oxygenated hydrocarbon synthetics as by-products.

In conjunction with these plants will be built chemical separation plants for the recovery and purification of the by-product chemicals as well as for the production of esters and higher alcohols. The following estimates of the synthetic organic chemicals which are expected to be produced from the Brownsville plant indicate the large volume of available petroleum chemicals[6].

The Hugoton installation is expected to be capable of producing quantities of chemicals in the same order of magnitude.

Estimated Production of Chemicals from One Hydrocol Plant

	lbs. per year	
Methanol	730,000	
Ethanol	63,680,000	
n-Propyl alcohol	14,400,000	
n-Butyl alcohol	4,370,000	
n-Amyl alcohol	1,060,000	
		84,240,000
Acetaldehyde	9,100,000	
Propionaldehyde	1,930,000	
n-Butyraldehyde	2,750,000	
		13,780,000
Acetic acid	24,700,000	
Propionic acid	8,700,000	
n-Butyric acid	4,200,000	
		37,600,000
Acetone	11,200,000	
Methyl ethyl ketone	4,780,000	
Methyl n-Butyl ketone	250,000	
Methyl propyl ketone	600,000	
		16,830,000
		152,450,000

Many of these chemicals have never been produced in large quantities, but it is expected that uses for them in the industry will develop. The impact of this production of chemicals such as acetone, methanol, methyl ethyl ketone, ethanol and normal propyl alcohol is the subject of much discussion, but since the chemicals production plants will not be completed for many years, it is believed that the increasing demands for most of these materials will tend to offset over-production. The actual production of purified chemicals from the above list of chemicals and quantities available will be governed by supply and demand and the economics involved and will be prepared for the market to meet demands.

In these Fischer Tropsch plants as well as in many other plants for the production of synthetic chemicals from petroleum and natural gas, many of the process techniques, well known to the oil refining industry, are finding excellent application. The process units for the production of the intermediate source materials from petroleum such as ethylene and propylene are very similar to petroleum refining plants. These process techniques are discussed more fully below.

Many new plants for the production of ethylene are now under construction or being projected which will continue to increase production over the next five years. The following currently reported list of ethylene producing plants and their estimated daily production serves to illustrate the importance of this intermediate. The plants listed are those which manufacture ethylene from petroleum and natural gas constituents; alcohol dehydration plants have not been included.

Approximate Production of Ethylene
Pounds per Day

Carbide & Carbon, South Charleston Whiting Texas City, Texas	900,000
Dow Chemical Co., Midland, Mich.	150,000
Dow Chemical Co., Velasco, Texas	80,000
duPont, Orange, Texas	150,000*
Ethyl Corp., Baton Rouge, La.	50,000
Ethyl Corp., Baton Rouge, La.	150,000*
Jefferson Chemical Co., Port Neches, Tex.	175,000*
Koppers Co., Kobuta, Pa.	40,000
Monsanto Chemical Co., Texas City, Tex.	175,000
Shell Chemical Co., Houston, Tex.	325,000
Southern Calif. Gas Co., Los Angeles	800,000**
Standard Oil Co. of La., Baton Rouge	275,000
Other producers	100,000
Total	3,170,000

* Under construction
** Shut down recently

For the production of ethylene the petroleum industry offers as raw materials refinery off-gases containing propane and ethane and the respective olefins, also propane and ethane from natural gasoline and cycling plants, and liquid stocks such as naphtha, gas oils and reduced crudes. Composite refinery off-gases, while they vary depending on the types of operation carried out in the refinery, will show an approximate composition in mol and weight percent in Table I. Cracking operations in a refinery produce light hydrocarbon paraffins and olefins, and catalytic cracking produces more olefins than thermal cracking. The extent to which these operations

are carried out in a refinery, therefore, influences the percentages of ethylene, propylene and ethane, propane in a refinery off-gas. The ethylene in the off-gas is recovered along with ethylene which is produced by cracking ethane and propane. The cracking operations for the production of ethylene from ethane, propane and heavy oils are carried out at low pressure and high temperature with relatively short furnace residence time.

TABLE I

	Mol %	Wt. %
Impurities	4.0	3.2
Hydrogen	1.0	0.1
Methane	9.0	4.1
Ethylene	5.0	3.8
Ethane	25.0	21.1
Propylene	9.0	10.5
Propane	46.0	55.6
Butanes	1.0	1.6
Total	100.0	100.0

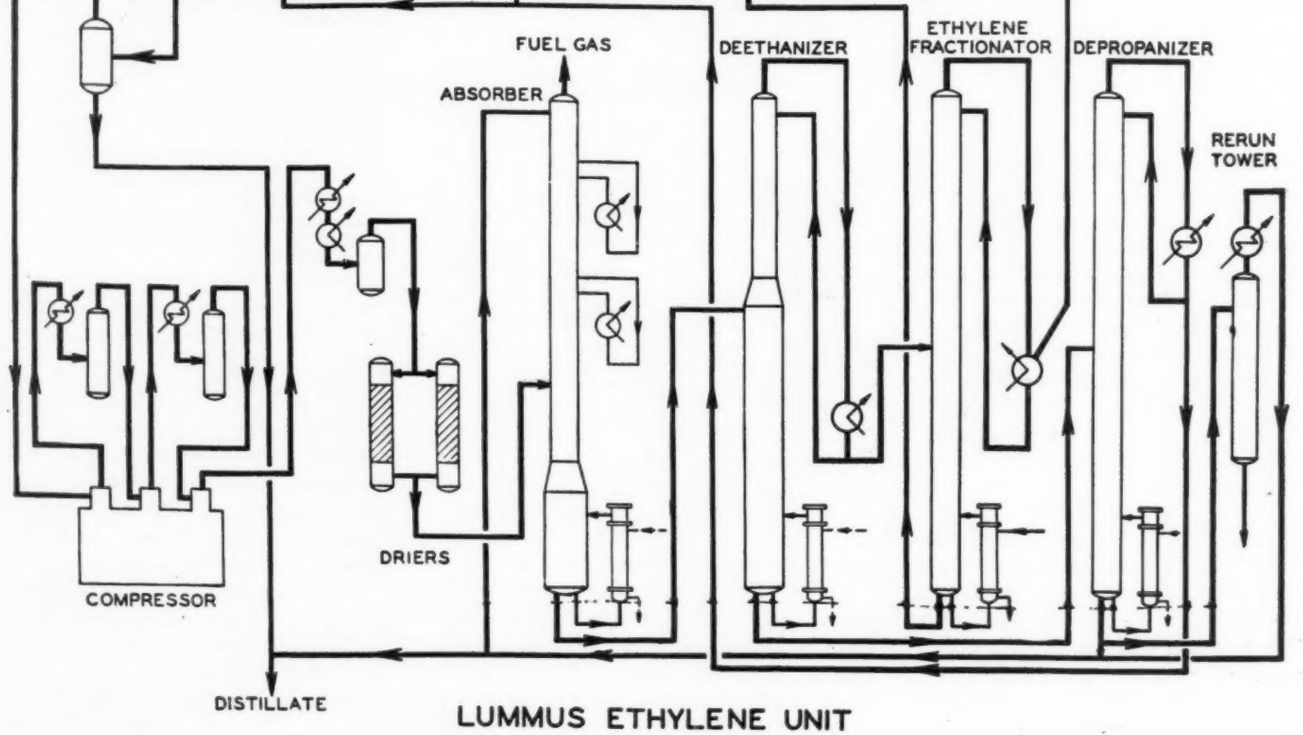
Typical ultimate yields of ethylene from ethane, propane and gas oil in weight percent are 75, 48 and 25-32 respectively. At approximately 45 percent conversion per pass, propane yields 16.7 weight percent of ethylene and 15.8 weight percent of propylene once through. The yield of propylene once through thermal cracking of heavy oils varies from 6 to 16 weight percent. Propylene may also be produced by catalytic dehydrogenation of propane with ultimate yields of over 90 weight percent. Some early production of ethylene employed multiple recuperative checker brick furnaces for cracking heavy gas oils or reduced crudes. One of these furnaces was heated up to white heat by the combustion of fuel, steam was then passed through the checker brick thereby being preheated to 2,000°F. Charge oil was then blended with the steam and the operation continued until the temperature dropped to 1,500°F when this operation was switched to another furnace. The first furnace was then reheated and the cycle repeated.

Tubular furnaces have been employed for the cracking of ethane, propane, naphthas and gas oil stocks. More recently heavy stocks have been cracked at high conversions per pass in a continuous moving bed of inert material in an attempt to overcome the difficulties resulting from coke formation in tubular furnaces with these types of stock. The results have been promising and a yield comparison of moving bed cracking vs. tubular cracking on a paraffinic gas oil of about 650°F end point follows:

		Moving Bed	Steam Tubular
Temperature °F.		1382	1350
Hydrogen	Wt. %	1.2	0.4
Methane	"	11.0	8.0
Ethane	"	0.4	5.3
Ethylene	"	25.0	14.7
Propane	"	0.7	1.0
Propylene	"	12.5	15.2
All C_4 fractions	"	7.5	10.6
Distillate & Fuel Oil	"	41.0	44.0
Coke	"	0.0	0.0
Totals		99.3	99.2

Stocks have also been cracked successfully for ethylene and propylene by direct contact with molten lead.

The problem of separation and purification of ethylene from charge stock and furnace effluents has been handled in several ways. Absorption, low temperature fractionation, and charcoal adsorption are the tools which are being used for this purpose. Their economic application depends upon the concentration of the component to be removed, the purity desired and general process considerations. The furnace effluent stream is generally quenched by direct contact with water and then compressed to the operating pressure of the first processing tower. Flow sheet (below)[3] shows the process flow of a modern ethylene plant charging refinery gas. The first tower, whether a low temperature fractionation tower, an absorber or a charcoal adsorber, serves to remove the methane and lighter as overhead fuel gas with a minimum loss of ethylene. The ethane and heavier fractions are then sent to an ethylene tower operating at low temperature which removes ethylene product overhead. When propylene is not removed as a product, the ethane, propane and propylene are then cracked for the ultimate production of ethylene. In the method shown in the chart, the ethane and heavier bottoms are processed in a de-ethanizer which removes an overhead of ethane plus ethylene. This overhead is then



LUMMUS ETHYLENE UNIT

charged to an ethylene fractionator where product ethylene is removed overhead. The ethane bottoms from the column are charged to ethane cracking furnaces. The bottoms from the deethanizer are charged to a depropanizer taking overhead propane and propylene as furnace charge to propane furnaces. The bottoms from the depropanizer are rerun to furnish aromatic distillate by-product, which is also used as an absorbing medium when an absorber is used on the furnace effluent gas to remove methanes and lighter[6]. When propylene is required as product, the overhead stream from the depropanizer can be separated and purified to 80-85 percent purity by straight fractionation at high reflux ratios or to higher purities by either extractive or azeotropic distillation or charcoal adsorption.

The thermal production of ethylene and the thermal or catalytic production of propylene is almost always carried out as a recycle operation to obtain optimum yields of products. The selection of proper recycle ratios in the design and operation of a particular plant is of considerable importance in view of the problem of purification. It is influenced by economic considerations such as the yield loss or gain at various recycle ratios and the expense of manufacture at different plant capacities.

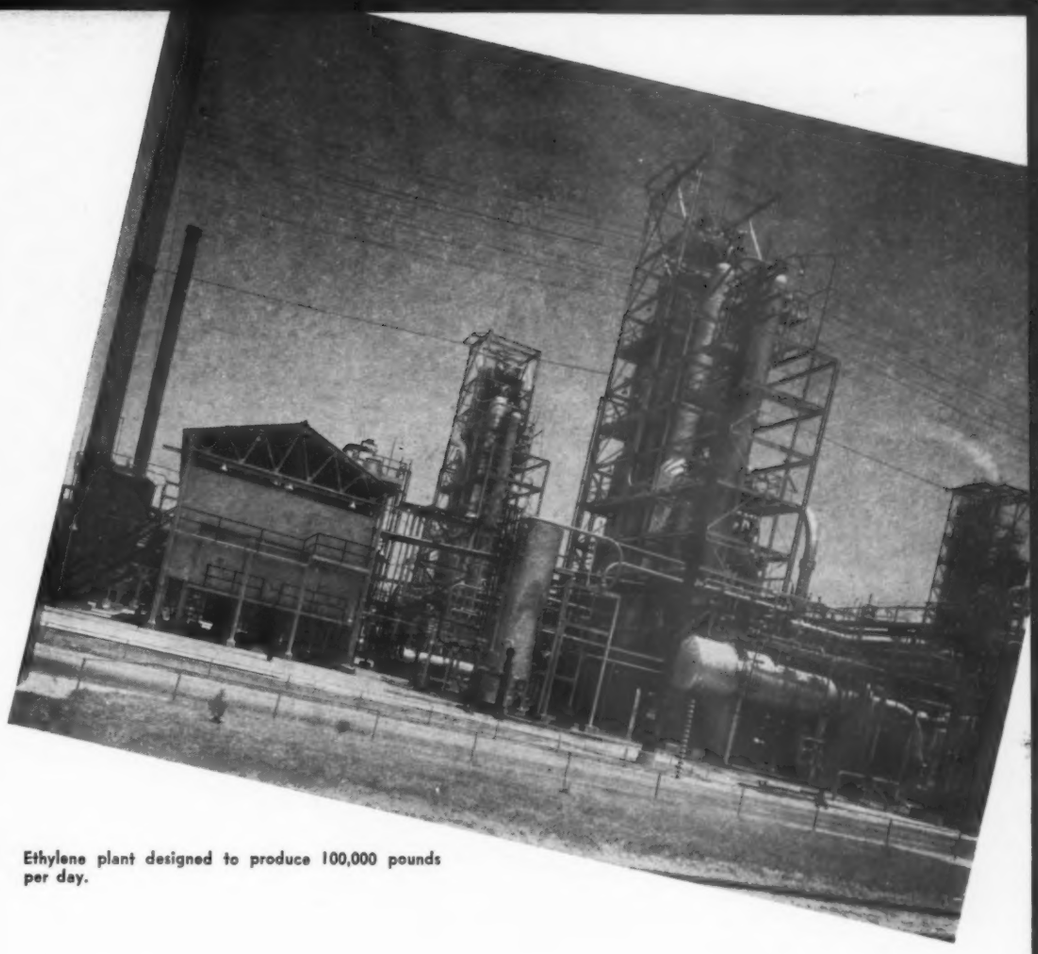
Investment and operating costs of an ethylene plant are primarily dependent on (1) the plant capacity and (2) the cost of charging stock and utilities, particularly fuel. To illustrate, an ethylene plant for the production of 100,000 pounds per day of ethylene, using an average composite refinery off-gas as charging stock, will at today's prices cost approximately $2,500,000. Doubling the production figure would increase the investment to $4,000,000 i.e., by $1,500,000.

Another 100,000 pounds increase would only cost $1,250,000 additional or just one-half as much in capital investment as the first 100,000 pounds per day of production. For a plant producing 100,000 pounds of ethylene per day from a refinery off-gas with heavy fuel worth three cents per gallon, the net manufacturing cost per pound of ethylene is 3.5 cents. This figure reduces to 2.9 cents for a plant of 200,000 pounds daily capacity and to 2.7 cents for the 300,000 pound per day plant. The respective figures with heavy fuel oil worth only one cent per gallon are 2.5, 2.0 and 1.9 cents per pound of ethylene.

With gaseous charge stock and fuel oil at one cent per gallon, the components of total manufacturing cost of ethylene are as follows:

Breakdown of Ethylene Manufacturing Cost (Cents per pound)

Plant capacity, pounds per day	100,000	300,000
Fixed charges	1.4	0.9
Direct operating expense	0.8	0.7
Net cost of charge stock	0.3	0.3
Total manufacturing cost	2.5	1.9



Ethylene plant designed to produce 100,000 pounds per day.

These figures include a nominal allowance for yard construction outside of battery limits, for steam generating facilities, cooling tower and cooling water pumping plant, but no storage either for charging stock or finished products. It also does not include loading or unloading facilities, which in many instances are not required as the processing units are usually located close to the ethylene producing unit.

If propylene is recovered in approximately equal quantity with the ethylene, the total plant investments increase approximately 25 percent, but on the basis of equal value of propylene and ethylene, the unit manufacting cost of either is reduced approximately 30 percent.

The manufacturing costs of products from ethylene further reflect the advisability of large capacity plants for minimum cost of product. Ethylene is converted into ethylene oxide in one processing scheme by the use of chlorine and lime and may be further processed for the production of ethylene glycol by the use of weak sulfuric acid as catalyst and concentration by distillation. If we assume off refinery gases at one cent per therm (100,000 BTU), chlorine at 1.75 cents per pound and lime at $8.00 per ton, a 30,000 pound-per-day ethylene plant would show a production cost for ethylene of four cents per pound, ethylene oxide 10.3 cents per pound and ethylene glycol 74 cents per gallon, while a plant which produces 100,000 pounds of ethylene per day would show respectively 2.5 cents, 9.2 cents and 58 cents for the three products. The approximate investments of these two plants for the manufacture of ethylene glycol including utilities are $2.3 and $4 million respectively.

Another important factor bearing on the economics of these products is the availability of various petroleum raw materials for the production of ethylene. Current price levels of the liquefied petroleum gas market are depriving ethylene plants of increasing amounts of propane charge stock. It is possible that in the near future propane for ethlylene manufacture will become scarce resulting in greater dependence on ethane. In many cases it may be necessary to resort to the selection of heavier stocks in spite of the fact that investment and operating costs will increase. For the present the expansion in natural gasoline plant operations is making available larger quantities of propane and ethane. In the long range future the Fischer-Tropsch process using natural gas and later coal will be a factor in the supply and demand of ethylene and petroleum chemicals.

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Indonesians celebrated rehabilitation of the Palembang plant with religious ceremonies which included a Selamatan parade in which decorated krandjangs were borne to various plant units. In each krandjang was the head of an animal which was buried amid good-luck wishes for the smooth functioning of the unit. The krandjang then was left over the buried head until it disintegrated P.S. They ate the rest of the animals.

PALEMBANG REFINERY REOPENED

STANDARD-VACUUM Petroleum Maatschappij resumed operations on a substantial scale at its Palembang refinery on October 6. The wrecked plant thus went back on stream about a year after Standard-Vacuum regained control and about three months after production crews were able to get into the producing areas and the pipeline repair started on their part of the job habilitation in order to be able to pump crude to the refinery by November.

The refinery particularly was a mess when Gen. Mgr. H. A. Gibbon and his staff saw it again after his absence of four years. It had been wrecked under Dutch military direction in 1942 when the Japs attacked, and wrecked again by American bombers when the tide of war ebbed once more to the shores of Indonesia. Not only was the plant a wreck but the personnel to rebuild and operate it was scattered by four years of war; their homes were destroyed, they lacked food and clothing and were four years behind the parade in technical knowledge and skill.

Before the war Standard-Vacuum employed some

11,000 persons in the area, of whom more than 10,000 were local. There were some 500 European employees, mostly Dutch, and a few Americans. All of the Dutch who did not manage to escape had been interned and were in poor physical condition. The Indonesians were scattered through the island living off the land as best they could, their prewar skills largely forgotten.

Mr. Gibbon's first job was to round up his personnel, get them places to live, clothes to wear, food to eat. His next was to start their re-education. The former Dutch employees were given six months' salary and transportation to Holland for rest and rehabilitation. As soon as they were in better physical condition, many were brought to the United States for refresher courses in refineries and in the producing fields. Here they learned what had been taking place in the techniques of producing and refining while they had lived behind barbed wire.

The former Indonesian employees were brought back to the plant site and fields, where housing was arranged, food and clothing supplied. Thus far more than 7,000 tons of food have been brought in for these people. As a matter of fact, food and clothing have been money in the Palembang area since Mr. Gibbon and his staff arrived. Until recently there was no currency in which Indonesian employees could be paid. Several currencies were floating around, but nobody had confidence in them, so employees were partly paid in food and clothing and partly given credit on the books for later payment when economic conditions become more settled.

At the present time Standard Vacuum has a little less than half as many employees at Palembang and in the adjacent fields as it had before the war. The number is being increased as rapidly as living quarters and the scope of operations permit. There are now 71 Americans in the area, 350 Dutch and about 4,600 Indonesians and Chinese. Both the Indonesians and Chinese are highly satisfactory workers in an oil operation. They make fine welders and skilled mechanics after a reasonable amount of training. An instance of their quick comprehension of mechanical problems was seen in the producing fields when the company was able to get in last July. Several wells were burning out of control when company technicians arrived but the local staff extinguished all but the worst and famed oil-well fighter Hugh L. Patton, of Houston, was flown over to supervise the work of putting out the two which remained. Necessary equipment was fabricated while Patton was enroute, and when he reached the field he was able to get fires out in two days with the aid of native workers. Most of the work of directing the helpers was done with hand signals as neither understood the other and the service of interpreters doesn't work too well when a fire is being fought.

First rehabilitation work after housing was undertaken at the 1,200,000-barrel deepwater terminal at Tandjong Oeban, 30 miles southeast of Singapore, and reconstruction of the Palembang refinery. Before the war this plant ran 45,000 barrels of crude per day, producing 100-octane aviation gasoline, motor gasoline, kerosene, fuel oils and wax. The plant furnished about 50 percent of the total product requirements of Standard-Vacuum and its subsidiaries which market in China, Siam, Indo-China, Malaya, Philippines, Netherlands, Indies, India, Burma, Ceylon, Australia, New Zealand, the South Pacific islands and South and East Africa.

While they were in possession, the Japs were never able to restore the 100-octane plant to production. Crude througout never exceeded 40 percent of prewar capacity, although enough crude oil was available to meet any still capacity which the Japs could have got into running condition. A little cracking was done but only low-octane motor fuel was produced.

Plant rehabilitation was held back as much by the Jap methods of operation while they were in possession as by the double military destruction. Virtually no maintenance work was done. As a result the plant went down hill very rapidly so that the rehabilitation job was much more than replacing missing or damaged parts. Everything had to be worked over.

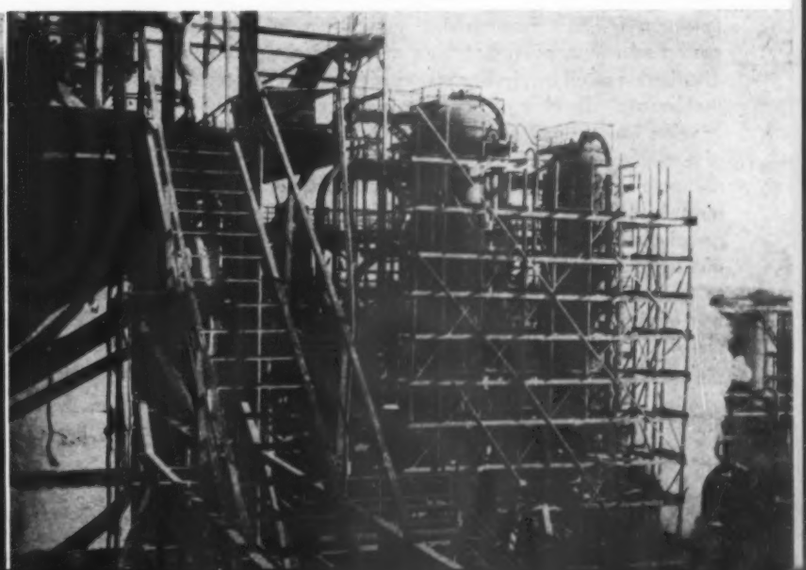
The Palembang plant was supplied with crude before the war by a six-inch and two eight-inch lines laid to the Talang-Akar and adjacent fields some 80 miles inland. After the Dutch demolition, the lines never were put into good operating order by the Japs. The system is now in shape again, however, and will be ready to deliver 45,000 barrels daily as before the war as soon as the plant is ready to handle that much oil. At the moment the plant is handling 20,000 barrels daily with some cracking capacity now operating but not all. By next February the crude capacity will be up to 32,000 barrels daily and to 45,000 barrels before the end of 1948. The wax plant also will be operating sometime next year.

Property damage in the Talang-Akar and surrounding fields was much less than at Palembang. Probably less than 10 percent of the wells were destroyed so that they cannot be put back into production with reasonable clerity. Although Standard-Vacuum producing engineers were not able to get into the fields until the rehabilitation until July, by dint of plenty of hard work they are now able to keep pace with the refinery's crude oil requirements.

The Indonesians are glad to have Standard-Vacuum back on the job. Resumption of operations at Palembang was marked by an interesting ceremony which took place recently. Called a "Selamatan," it involved a parade at the conclusion of which the heads of goats and carabao were brought in and buried in front of each unit. This would assure, the native hoped, that the plant would operate smoothly when put on stream. Many of the Indonesians remembered that before the Japanese came they had eaten better, dressed better and wre better housed, and the Selamatan ceremony was an expression of thanksgiving that they were about to return to the more comfortable existence.

Raising a new stack on one of the 750-pound cracking coils.

Primary and secondary towers on a 750-pound unit being repaired.



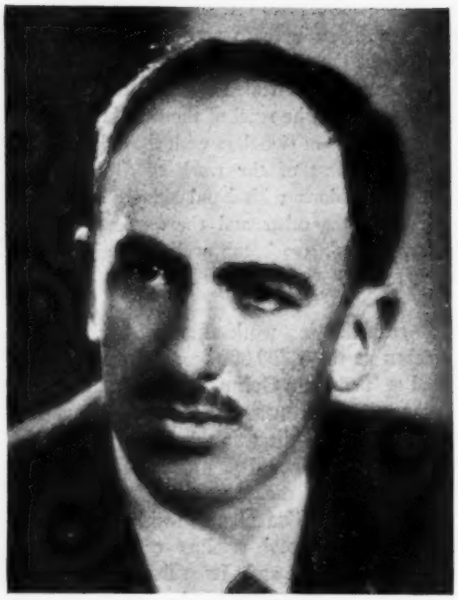
BOLIVIA'S PROGRAM FOR OIL DEVELOPMENT

By Ing. Guillermo Mariaca

IN 1937 when Yacimientos Petroliferos Fiscales Bolivianos took over the administration of the Bolivian oil industry, the government enterprise found a series of fields tested by wildcat drilling. However, none of these fields had been drilled enough to offer possibilities for commercial exploitation. On the other hand, while the wildcats confirmed the existence of oil in some structures, they did not reveal much about the reserves and relative quality of the oil hidden in them. At this time and during the years that followed, YPFB faced two difficult problems in its effort to attain the following objectives: (1) To obtain a production of oil and oil products enough to supply the nation, (2) To supply the home market with these products at prices reasonably low in order to promote the economy and industrial development, (3) To produce oil in sufficient quantities so as to have a margin for export sales with the purpose of improving the balance of trade.

For the fulfilment of these aims the company required, first, complete studies that would make possible the analysis of the oil problem considering all factors with bearing on it, and, second, means to carry out the plan adopted as a result of the studies. Although the former seemed to have an easier solution, it was actually more complicated.

In 1941 the government of the United States of America sent the well-known Bohan Mission to Bolivia. When the Mission started to consider the Bolivian oil problem, it discovered that there were no surveys or data of any kind available that would enable it to recommend a definite solution to the problem. In the first place the extent of the reserves of the different oilfields operated by YPFB was not known with enough certainty to lay the foundation for a serious survey and, in the second place, no studies of the transportation facilities from producing locations to centers of consumption had been made and the distribution of oil by pipeline was considered very problematic. In view of these circumstances the Mission had to limit its advice to the adoption of a temporary plan that could partially mitigate the urgent necessity of importing oil products to meet the demands of the country. The plan suggested consisted of the development of the Sanandita oilfield and the transportation of oil products to the centers of consumption in the highland by way of Argentina. This program was not completed since the wells drilled in Sanandita revealed what had been guessed from the very beginning—a scanty production of oil. Also other factors interfered as a direct consequence of the United States entering the war, making it more difficult to obtain materials in the quantities required, and finally, as it was apparent that the plan lacked the desired firmness and also on account of political motives created by the war itself, it was impossible to obtain financial help for its development.



Guillermo Mariaca

In the meantime YPFB started to consider the problem on a sound basis, determining the approximate extent of the reserves in the known fields. The new drillings and geological surveys made in the different oilfields showed that among the existing fields the only one with enough reserves to justify the high investment required was the Camiri field.

The potentiality of the oilfield was determined at around 20,000,000 barrels by several competent geologists who agreed on its extent. Later drilling have not only confirmed this quantity but increased it to 28,000,000 of known reserves.

Having selected the oilfield to be developed, it was necessary to find a solution to the problem of transportation, which is severe and fundamental in Bolivia not only for the oil industry but for the entire economy of the nation. Although generally accepted that the most economical means of transportation, with the exception of maritime, is pipeline, neverthless it was argued that on account of the highly uneven topography of the country and of the small volume of consumption in the highland regions, the construction of a pipeline from Camiri with connections to the railroads in the center of the republic would be too difficult and expensive. Its cost had been previously estimated at over twenty million dollars. However, YPFB studied the problem and surveyed possible routes and found that the cost of the pipeline would be from six to eight million dollars, and consequently the investment required would be reasonable.

Having solved theoretically the basic problems of the formation to be developed and means of transportation to be used, it remained necessary to find a way to carry out the program, that is, its financing and construction.

Two possibilities were considered as a solution for the problem of transportation: the construction of a pipeline from Camiri-Sucre and from Camiri-Cochabamba. After analyzing transportation and distribution cost of oil and its by-products, the Camiri-Cochabamba route was selected for the pipeline as the most convenient for the advantages it provided.

The present program of YPFB consists of two parts: program of self-dependence in the purveying of oil products for domestic consumption, and program for oil exportation.

The following conclusions were reached as a result of the studies undertaken by YPFB:

(1) That the only field in the country with enough reserves to justify the high investment required to provide for the supply of the home market was Camiri, and consequently it was necessary to develop the field in order to obtain a minimum stabilized production of 3,000 barrels per day.

(2) That wildcats should be drilled in favorable locations close to Camiri, Guayruy and Mandeyapecua to assure a reserve of oil for the future and also with the purpose of obtaining crude of different quality from that of Camiri which is very light and cannot render all the products needed by the country in the required amounts. In the district of Camiri fifty more wells will be drilled with a total investment of two million dollars; of this amount one million has already been spent in the purchase of materials and equipment.

(3) That a pipeline should be constructed from Camiri with terminal in the vicinity of Cochabamba. Total cost of this pipeline will be $6,550,000.

(4) That a pipeline should be constructed from Lamboya with terminal in the city of Sucre. The cost of this line has been estimated at $525,000.

(5) That a refinery should be erected at Sucre with a maximum capacity of 1,500 barrels a day.

(6) That a refinery should be erected at Cochabamba capable of producing high-octane aviation gasoline, with a daily capacity of 5,000 barrels. Both refineries have been designed for future enlargement by simple additions without changes in the basic installation. Cost of both refineries will be roundly $4,475,000.

According to the studies, the program adopted represents a profit of over a million dollars a year as compared to the project of only one refinery at Sucre, and a disadvantage of approximately five hundred thousand dollars a year over the project of only one refinery at Cochabamba. However, with the purpose of meeting the demands of Sucre, the government and YPFB have considered it desirable to install the refinery in that city. It should be noted that the negotiations with the Import–Export Bank have been changed because of this part of the program and that the bank will not finance it directly for the sole reason that it does not consider such measure practical from an economic standpoint.

The profits from this program have been estimated at a minimum of four million dollars for the year 1949. This amount will continue to grow as the consumption of the country increases. On this same basis, the country will obtain a saving of around three million dollars per year on foreign exchange. These figures are based on a reduction in the selling price of those products which have direct influence on the cost of the basic industries of the country, such as diesel oil and fueil oil, or on the cost of living of underprivileged classes, such as kerosene. For example, diesel oil, which today is sold up to 3.80 Bs. per liter, will be sold throughout the republic at 2.00 Bs. per liter; fuel oil sold today up to 2.50 Bs. per liter will be sold at 1.50 Bs., and the price of kerosene will be reduced by 0.50 Bs. in all zones of the country affected by the pipelines.

As soon as YPFB is able to cover the liabilities it has contracted for development of the program, the prices of oil products may be reduced to a larger extent if such a step is necessary. In this respect it is important to observe that the oil industry is considered as a basic industry, the products of which are utilized by all other producing industries, so the oil industry, especially with reference to its heavy products, has a fundamental influence on the cost and development possibilities of other sources of wealth. Hence it is important to develop the oil industry with maximum efficiency and economy and to maintain the projects of the industry free from political interference.

The program of the oil industry represents an investment of $14,150,000, of which eight and a half millions will be granted by the Import-Export Bank of Washington, five millions by the Central Bank of Bolivia and $650,000 is represented by securities which will be paid when the program is put into practice. It was approved

Drilling of the Sanandita No. 15 well with portable equipment.

by the supreme government of Bolivia by the decrees of October 24 and November 29, 1946, after thorough analysis by a commission of Ministers of the Executive Power.

The Import-Export Bank of Washington has made a conscientious study of the program and has found that with the exception of the project for the installation of a refinery at Sucre, it constitutes the best solution to the oil problem of the country. The bank has therefore increased the original credit granted in 1942 by three million dollars.

It is expected that construction work will be concluded during 1948; the refinery of Sucre at the beginning of the year; and the refinery at Cochabamba during the second half.

This program will meet 75 percent of the domestic demand for aviation gasoline, ordinary motor gasoline, kerosene and gas oil, and 50 percent of the demand for fuel oil, a total of 80 percent of the demand for these products in the country as a whole, using only crude from Camiri. If heavier oils are discovered in Guayruy or Mandeyapecua as expected, the nation will be able to satisfy all the needs of the domestic market. This aim will be attained anyway after the program has operated for a year and a half; then the development of the Bermejo oilfield which yields very heavy crude will be undertaken to compensate for the deficiency.

YPFB has adopted the sound policy of planning a quick settlement of its liabilities; thus the company will use 75 percent of its profits in payment of obligations. It is calculated that in three years, commencing with 1949, it will have covered most of the liabilities. On the other hand, the Import-Export Bank has considered it advisable to demand a rapid payment. It should be noted that the program as a whole will be carried out without imposing a burden on the national treasury and will pay for itself in contrast with other investments that require additional resources for their requital.

The program of exportation represents a second stage of development for YPFB that will require amounts that will surpass by a wide margin the investments of today. It will mean, of course, the discovery of a formation with a potential production much superior to Camiri's so that the cost of production will be sufficiently low to be competitive with overseas prices in foreign markets.

YPF Buys Foreign Oil

The large increase in fuel demand in Argentina, that cannot be satisfied with national official and private production, has prompted the Government to have Yacimientos Petroliferos Fiscales to purchase in foreign markets the following products: 63,000 bbls. of aviation gasoline, 107,000 bbls. of gas oil; 220,000 bbls. of Diesel oil; 220,000 bbls. of kerosene; 44,000 bbls. of lubricants and 475,000 bbls. of motor gasoline. All of these products to be introduced free of duties.

It has also approved the purchase of 165,000 bbls. of crude oil and the signature of a contract between Y.P.F. and the Lobitos Oilfields for the purchase of 100,000 bbls. of Peruvian High Test crude and 50,000 bbls. of Peruvian Low Cold Test, the first to be used for the manufacture of liquid fuels and the second for the production of low cold test lubricants.

During the second quarter of this year and presently, the lack of gasoline and fuel oil in Argentina is pressing. Gasoline is being rationed and the black market is at play, gasoline being bought at from 60 centavos to $1 peso per liter (official price being 35 centavos). Fuel oil is very scarce and its supply is rationed.

Kellogg To Build Argentine Plant

Yacimientos Petroliferos Fiscales has awarded the contract for the construction of the new 22,000-barrel refinery to be built near Buenos Aires to The M. W. Kellogg Co. of New York. The new refinery represents an investment of nearly $10,000,000 U. S. currency ($80 million Arg. pesos).

The refinery is to have a complete combination unit, topping, cracking and gasoline recovery. It will include catalytic cracking, isomerization and alkylation units for the manufacture of high-octane aviation and motor gasolines. In order to increase the stock for aviation gasoline manufacture, the reduced crude from the topping plant will be run partly to coke; another part may be sent to a vacuum unit so as to be reduced to asphalt.

General view of Southern California Gas Co. naphtha cracking plant. Gas scrubbers are in the center foreground, oxide boxes for H_2S removal in the center, generator house, preheaters and boilers at right center.

HIGH TEMPERATURE THERMAL CRACKING OF PETROLEUM FRACTIONS

By Howard H. Heilman[1]

OVER the past decade much work has been done, but little publicized, on the use of extremely high temperatures for the thermal cracking of petroleum or its fractions. The work involved extensive and intensive development and research activities together with semi-works evaluation and finally plant-scale operation on large volume throughput. In this connection accounts have been published recently referring to a method of high-temperature cracking known as the Catarole process which is being undertaken by British industries.[2] During the past ten years and more the United States has witnessed integrated development and production work of great detail involving this type of pyrolysis together with the concurrent solution of the recovery and purification problems which existed for the myriad of unsaturated and aromatic hydrocarbons produced in this fashion. In this country one of the major sustained programs by industry in this phase of the petroleum and chemical art is represented by the type of operation known as the Ugite process.

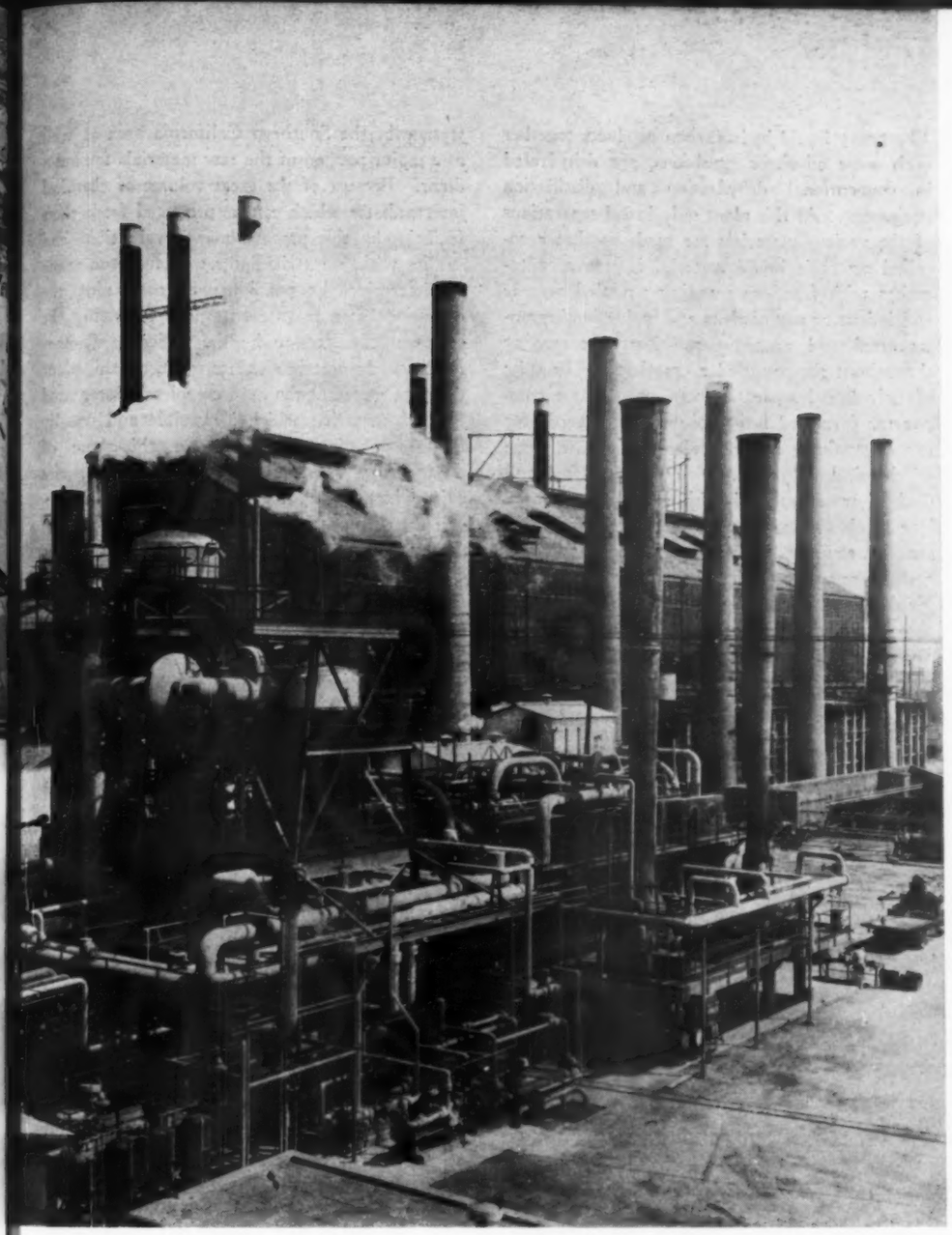
The Ugite process stemmed from inclusive evaluations by the United Gas Improvement Company, beginning in the '30's, designed to determine comprehensively many factors relating to the economics of utility gas production and the market demand and utilization possibilities of chemical intermediates which were associated with these operations. The field which was selected for such thorough exploration proved to be a widely expanding one. The United Gas Improvement Co. expended over $5,000,000 in thermal cracking research alone and approximately 300 patents now apply to various phases of the process. As it appears today the products encompassed by the Ugite Process enter into a tremendously large and diverse number of uses. In addition to the many small-scale and experimental uses of Ugite products or intermediates, large volumes of unsaturated and aromatic hydrocarbons thus obtained have been utilized in many of the resin and solvent fields, among others for rubber, insulation, adhesives, waterproofing, materials of construction and protective coatings. Similarly from these intermediates large volumes of commercially pure chemicals have been manufactured in recent years, such as styrene, benzene, cumene, isoprene, propylene, butadiene, dicyclopentadiene and others.

The large number of patents covering products or adaptations and applications of the Ugite system have been transferred under an exclusive licensing arrangement to the Pennsylvania Industrial Chemical Company. This company shared some of product evaluation work with the originators and currently recovers a variety of final saleable materials from the base intermediates. Although the Catarole process, above referred to, is primarily in the construction stage in England under the sponsorship of Petrochemicals, Ltd., a full plant-size project incorporating many of the Ugite methods has been maintained in production at Chester, Pennsylvania, for some years by the Pennsylvania Industrial Chemical Co.

In addition, under the sponsorship of the Office of Rubber Reserve, Reconstruction Finance Corporation, the standby gas plant of the Southern California Gas Company at Los Angeles, California, was modified and expanded to permit high-temperature cracking of naphtha fractions as a source of many raw materials for synthetic rubber and aviation gasoline. These operations at the Southern California Gas Company plant were based principally upon the Ugite process, and here again, as had been the case in many war emergency operations, know-how and patent positions were all advanced by private industry for free use by the government during the term of its wartime direction.

Several general classifications of operating conditions and recovery levels may be used in this type of high-temperature thermal cracking, depending on the petroleum charge stocks most readily and cheaply available and depending upon the end products desired or dictated by the economics resulting from the market demand for any particular chemical intermediates in any locality. Charging stocks have been principally reduced crude oils or straight-run naphthas and gas oils. Cracking and process conditions may be maintained to obtain the optimum yield of certain groups of dienes or olefins while secondary controls on the pyrolysis permit not more than the specified paraffinic content in a given aromatic fraction after the removal of olefins or dienes. Since this type of operation is cyclic in nature, precise analytical correlations with operating criteria are used in order to insure

[1] Consulting Chemical Engineer, Los Angeles.
[2] See WORLD PETROLEUM, Nov. 1946, p. 72.



Water treating unit and boilers are in the foreground; generator house and preheaters in the background.

homogenity of cracking. This type of control avoids any significant or deleterious quantity of over-cracking, such as destruction of dienes, concurrently with under-cracking, such as the existence of excessive percentages of paraffin hydrocarbons in solvent fractions.

Temperatures may vary from twelve hundred to nineteen hundred degrees Fahrenheit under equipment pressures only slightly greater than atmospheric. Residence times at these temperatures may vary as desired from fractions of a second to many minutes. Superheated steam is usually added with the vaporized oil to the gas generator or cracking chamber. The gas generators referred to are sometimes described as regenerative furnaces or stoves and are vertical cylindrical shells lined and filled with high-temperature resistant fire brick or specialty brick. An extremely important control point in the modern operation of this type of generator relates to a method of cycle timing so that the very short cyclic operation may be maintained whereby the total cycle time may be as low as one minute covering all phases from heating through purging and cracking. This control of a short cycle time with the greatest precision is critically important to homogeneous cracking and specification product yields of particular character or structure.

As an example of this type of cracking, reference is made to the plant operated for several years in Los Angeles by the Southern California Gas Company as an agent for the Office of Rubber Reserve. This plant has produced crude butadiene and butylenes in addition to several other products which were essential to the overall synthetic rubber program in Southern California. These operations are based on modifications introduced into standby gas plant facilities possessed by the Southern California Gas Company prior to the development of the national emergency which justified the synthetic rubber program. Government expenditures at the plant approximate $12,500,000, and the operation was started initially in June, 1943. Basically the processing at this plant consisted of the thermal cracking of straight-run naphtha in gas generators or shells as described above.

The generator cracking system during routine operation involves the use of four generators, each consisting of two shells. In the cyclic process for any given generator, while one shell is on the "make," the other shell is on the heating cycle. During the heating cycle, fuel oil or gas is burned within the checker brick of the shell with the effluent heating gases serving as a heat source for the tube-still preheaters which are used to heat the naphtha prior to injection or vaporization into the shell on the "make" part of the cycle. A total overall operating cycle of approximately six minutes is used and for about forty percent of the total cycle time naphtha is charged to undergo thermal cracking. This six-minute cycle is a relatively long period and is necessitated because of the tremendously large gas generators which exist at this plant. Superheated steam is introduced to the shell along with the naphtha and the operating control is based on the maintenance of an average cracking temperature under a specified residence time. Correlations of effluent gas specific gravity or other physical data permit continuous determination of the proper operating conditions. The cycle control is under completely automatic instrumentation which activates the fuel, steam or naphtha systems and flows as required. During production when optimum butadiene yield was desired, hydrocarbon residence time of approximately one second and temperatures, as measured, of the order of 1300°F were in effect.

The effluent gases and products from the generator shell pass through a water washbox system for initial condensation and cooling. The heavy liquid hydrocarbons pass through water-oil separation systems prior to the final charge of heavy oil condensate and emulsion to the dehydration and distillation units. The gas phases of the generator products which remain after essentially atmospheric cooling and absorption are compressed finally to approximately two hundred pounds per square inch and then enter an oil absorption and stripping process. The residue gas after removal of essentially all the butadiene and portions of ethylene and propylene is available for either plant or utility fuel. The residue gas is high in hydrogen and methane and contains ethane as well as some ethylene and propylene. Its hydrogen sulfide content is extremely low (less than 0.3 grains per cubic foot) as required for utility gas distribution. The removal of hydrogen sulfide is effected by iron oxide type purifiers before gas compression. For most of the period of operation at the Southern California Company's plant a fraction was recovered con-

sisting predominantly of ethylene and propylene. This gas fraction was further purified by facilities outside the plant in order to supply high concentration ethylene for the production of ethyl benzene and styrene while the propylene served for the manufacture of cumene and for alkylation processes in conjunction with the manufacture of aviation gasoline or for the production of chemicals such as isopropyl alcohol.

From the distillation units following the high pressure absorption a butadiene-butylene fraction was separated to serve as a source of butadiene after purification or by dehydrogenation of the butylenes. From this same so-called high pressure processing phase of the generator products there are available crude streams containing for the most part isoprene in one case and dicyclopentadiene in the other. This latter material is produced from the C_5 fraction by the selective dimerization of cyclopentadiene to dicyclopentadiene so that only a simple stripping operation is necessary to remove the isoprene fraction from the dicyclopentadiene fraction. This selective dimerization operation is maintained under conditions of temperature and pressure so that only the most minor polymerization of other C_5 dienes occurs.

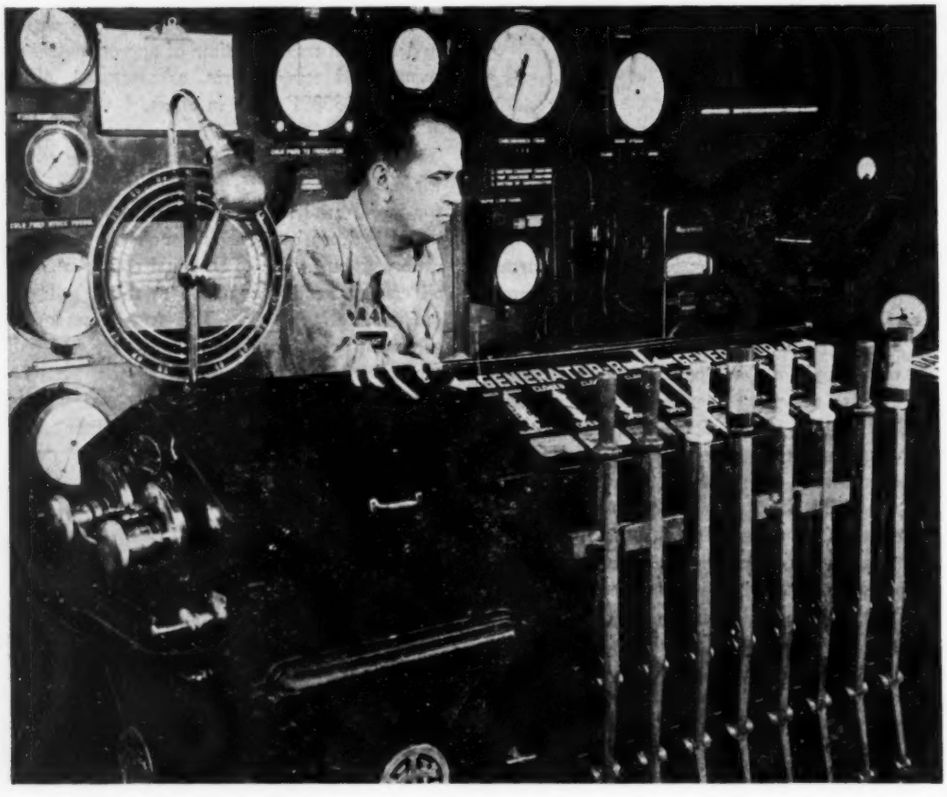
The heavy liquid hydrocarbon products together with some oil-water emulsions, are dehydrated in conventional dehydration and distillation equipment. At this plant only broad separations of the various materials are made so that a so-called aromatic liquid material is recovered together with fractions containing methyl styrene and indene or naphthalene and higher-boiling unsaturated and aromatic constituents extending throughout the so-called aromatic tar. In spite of only broad separation various of these components furnished large volume of materials for use in synthetic rubber, aviation gasoline, resin or chemical industries. Benzene produced and purified was combined with ethylene or propylene to obtain styrene or cumene. After hydrogenation some boiling ranges of aromatic hydrocarbons served as aviation gasoline base stock. Naphthalene, in a critical short situation throughout the war as well as now, was recovered and purified for the many chemical and allied usages it now supplies.

At the peak of its capacity operations the Southern California Gas Company plant charged approximately 17,000 barrels per day of straight-run naphtha. At this same level of throughput this plant provided the total raw materials for styrene in the Southern California area as well as a major portion of the raw materials for butadiene. Because of the great volume of chemical intermediates which can be produced from these facilities by this process, many evaluations and studies with industrial interests have been made to determine the possibility of continuing the operations as a private enterprise following the cessation of direction by the Office of Rubber Reserve. In certain significant aspects this plant does not represent the most completely integrated type of operation which is possible and usually most economically feasible for this type of processing. Then again, certain contingencies exist which are a reflection of the specific development made of the plant for the wartime purposes which may make more difficult its industrial rationalization.

Regardless of the final disposition of the Southern California Gas Company plant in Los Angeles, it appears that production of chemical intermediates and their final products will continue as based on the Ugite process and its modifications or expansions. Given a system whereby unusually high temperatures may be maintained without uneconomic deterioration of equipment together with the broad flexibility of component yields which are possible under carefully controlled and reproducible conditions, the process can be adapted to a variety of market situations. Obviously, for example, under certain conditions the recycling of some initial products can effect a desired product yield equilibria dependent on the type of intermediates desired and the utilization thereof. Then, conditions of cracking and recovery can accommodate conditions for very high to very low gas yields, or can produce essentially aromatic components in a given boiling range, or produce dienes or olefins of desired characteristics particularly with respect to the diluents occurring with the desired materials. Some of the components which are of long-term industrial interest and which are normally available from such a process system are as follows: ethylene, propylene, butadiene, butylenes, isoprene, pipervlenes, pentenes, cyclopentadiene, dicyclopentadiene, methylcyclopentadiene, benzene, hexenes, toluene, xylenes and styrene, methyl styrene, indene, naphthalene, methyl naphthalenes, antracene, aromatic solvents and hydrogen.

The compounds listed above are only a portion of the materials known to exist and which have been recovered. The adaptation and expansion of utilization for many of the lesser-known chemically reactive hydrocarbons is progressing, and it appears reasonable to assume that as industrial utilization of various new chemical raw materials continues, a given integrated system of this type of cracking will continue concurrently.

Generator control panel showing United Gas Improvement automatic cycle controller. Mel Jones photograph.



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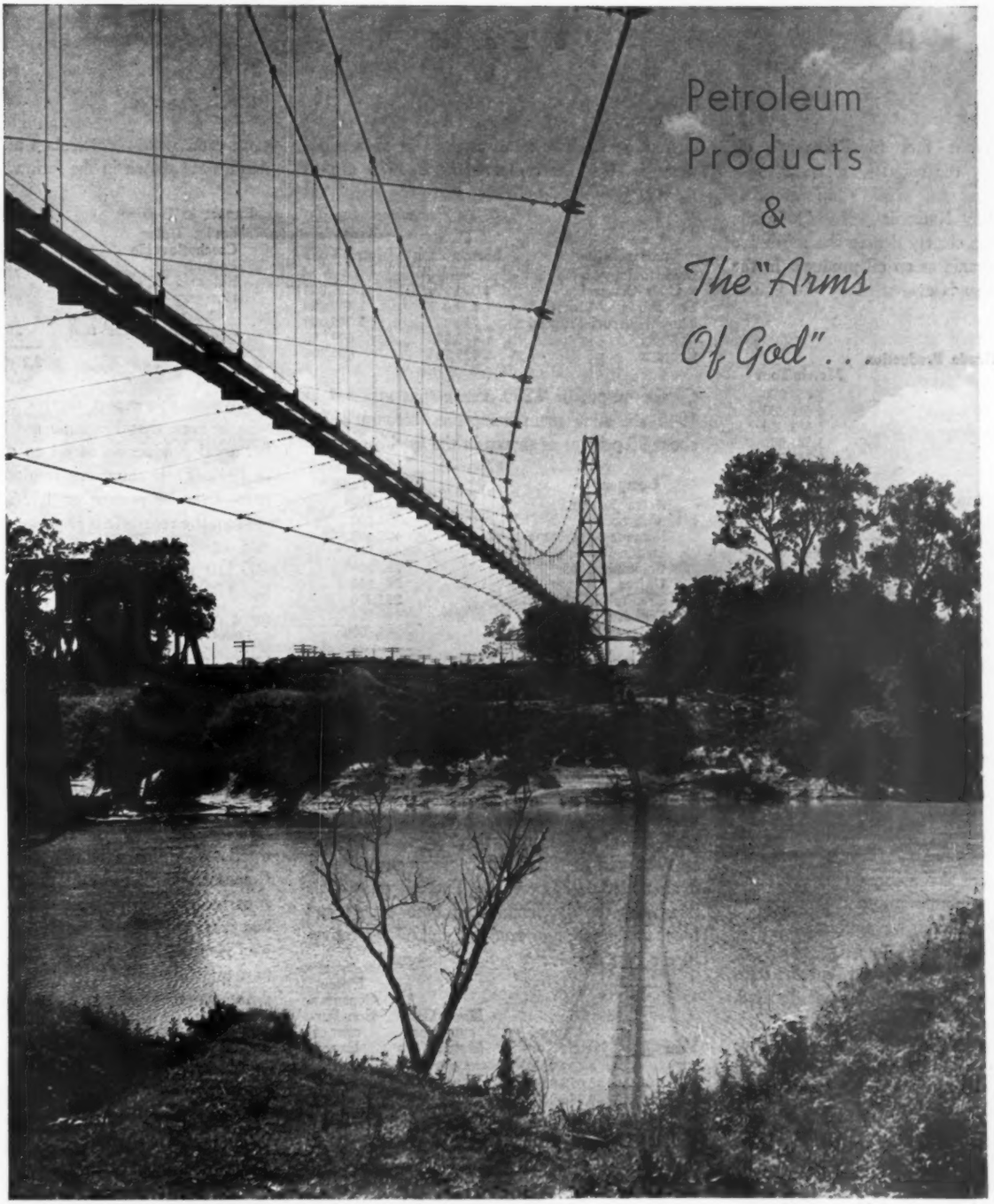


Legend says Spaniards fleeing Indians in Texas long ago were saved when a sudden flood in a stream they had just crossed stopped the savages. Thankfully, they named the protecting river the "Arms of God," in Spanish, "Brazos del Dios," now shortened to Brazos. Modern Brazos floods seem heedless of whose path they block, but flow of petroleum products in the 8-inch line above will never the interrupted. Brown & Root, Inc. have bridged the Brazos near Sealy with a 625-foot (between towers) pipe line crossing of their design, fabrication and erection. Take your river problems to Brown & Root, Inc.

BROWN & ROOT, INC.

P. O. Box 2634, Houston, Texas

ROMANIA TO REVISE EXPORTS

By E. A. Bell

THE preponderant fact in Romania's oil economy is that the country, as from 1946, ranks ninth among the world's oil-producing countries. In 1939 Romania was sixth in the list. These figures clearly denote the regressive movement of Romania as an oil producer in the past decade, as also is evidenced by the figures below:

Crude Production	
Year	Metric Tons
1937	7,153,000
1938	6,610,000
1941	5,453,000
1944	3,525,000
1946	4,250,000

1944 marked the lowest level, barely 50 percent of the total reached in 1937. The severe contraction in 1944 is readily explainable by the fighting that was in progress in the country and the bombing that inflicted heavy damage on oil installations. Reconstruction was slow in 1945 but made good progress in 1946 as is shown by the rise in output to 4,250,000 metric tons or 60 percent of the 1937 figure.

Results for the current year so far have been disappointing. At present the daily output is not much more than 50 percent of the 1937 average and is less than five percent above the low record of 1944. This serious decrease prompted the Communist Minister for Commerce and Industry, Monsieur Gheorghiu-Dej, to include in his economic program, presented in June, proposals for increasing production. The objective is to raise the monthly average to 425,000 metric tons by December next, but the steps to be taken to accomplish this are not detailed.

The figures shown in the table below, which give particulars as to the daily output of the principal oil areas in 1938, 1946 and for June 1947, strikingly illustrate the contraction which has taken place in the production.

Average Daily Output by Districts in Metric Tons			
Areas	1938	1946	June 1947
Total	18,110	11,490	10,700
Baicoi	1,880	2,530	2,470
Boldesti	2,690	1,260	1,130
Ceptura	1,840	1,120	1,150
Gura	4,080	1,900	1,780
Moreni	3,610	1,630	1,800
Ochiuri	1,600	960	1,460
Others	2,410	2,090	910

The best gain was made by Baicoi which increased its output to a considerable extent in 1946 and showed the smallest contraction since then, while the other areas experienced a heavy falling-off in 1946 and in the first half of the current year. The totals attained in the various areas in 1946 as compared with 1939 are as follows:

Areas	1946 Metric Tons	1939 Metric Tons
Ochiuri-Razvad-Gura-Ocnitzei	1,090,000	1,626,000
Baicoi-Tintea-Liliesti	930,000	1,200,000
Moreni-Piscuri-Filipesti	750,000	1,049,000
Boldesti	470,000	694,000
Ceptura	420,000	694,000

Of the output of 4,250 metric tons attained in 1946 the nine main companies accounted for about 90 percent as shown in the list below:

Company	Metric Tons
Astra Romana	1,383,400*
Concordia	502,200
Romana-Americana	490,600
Steaua-Romana	440,500**
Colombia	290,300
Unirea	283,100
Creditul Minier	235,800
Prahova	199,800
Redeventza	48,200
	3,873,900

* 1938—1,690,000
** 1938— 708,600

It is to be noted that the brunt of the decrease falls on the export trade. In 1946 export aggregated only two-thirds approximately of the export total attained in 1945. Home consumption in 1945 represented only 45 percent of the export total, but the proportion rose to 70 percent in 1946. In the first quarter of the current year it amounted to 84 percent. The following table illustrates the development of both export and home consumption of crude oil and oil derivatives in the past decade:

Year	Export Metric Tons	Home Consumption Metric Tons	Home Consumption, Percent of Export
1938	4,495,000	1,674,000	37.2
1941	4,072,000	1,811,000	44.5
1942	3,374,000	2,097,000	62.1
1943	3,159,000	2,007,000	63.5
1944	2,166,000	1,108,000	52.4
1945	3,172,000	1,444,000	45.5
1946	2,270,600	1,600,000	70.5
1947 (1)	440,000	370,000	84.1
1947 (2)	157,000 (3)	122,000 (3)	77.7 (3)

(1) First quarter
(2) April
(3) Provisional figures

The Soviet Union, whose influence through the mixed Russian-Romanian oil concern known as Sovrompetrol (Societe Sovieto-Roumaine de Petrole, Societe Anonyme Roumaine) is preponderant in the Romanian oil economy, takes the bulk of the export. In 1946 Romanian crude oil and oil derivatives exported to the Soviet Union aggregated above 95 percent of the total exported. Czechoslovakia, with less than two percent, came next. Particulars as to export destinations are shown in the following list:

Export in 1946	Metric Tons	Percent
Soviet Union	2,166,150	95.4
Czechoslovakia	45,060	1.98
Poland	24,260	1.07
Bulgaria	5,590	0.25
Hungary	1,120	0.05
Yugoslavia, Switzerland	120	—
Exported as ships' fuel	28,300	1.25
Total	2,270,600	

Analyzing the export figures by destination, it will be seen that Romania sent more than half her total production of oil to the Soviet Union in 1946. These shipments resulted for the greater part—over 80 percent or 1,756,840 metric tons—from the reparations requirements of the armistice agreement of 1944, while the balance of 409,310 metric tons (nearly 20 percent) was based on the respective articles of the trade agreement concluded subsequently.

The principal routes of export were by water, Constantza leading with a total of 1,730,000 metric tons, while Giurgiu, the Danube port of transshipment to the south of Bucharest, accounted for 220,000 metric tons. The principal railway route for export to the Soviet Union is via Ploesti, Buzau and Galatz, where Reni is the frontier station on the route to the interior of the Soviet Union. Some 260,000 metric tons of Romanian-produced crude and derivatives were exported through Reni in 1946. This total was, however, not wholly conveyed to Reni by railway because Ploesti has been linked with Reni by a pipeline some 112 miles long, built partly with equipment obtained from the second pipeline between Ploesti and Giurgiu which had been built during the late war.

The ratification of the Russo-Romanian peace treaty by the Romanian Parliament on August 23 last will bring about a change in the oil export policy, it is generally believed, inasmuch as the treaty does not envisage oil exports to Russia to the same extent as the two agreements referred to above. It is anticipated that more oil will be available for other destinations, mainly in western and central Europe. This is one side of the interpretation given to the statement recently made by Moneieur Tatarescu, the Romanian prime minister, that despite Romania's non-participation in the Marshall scheme and despite the fact that she was refused membership in the United Nations organization, Romania does not intend to sever her economic links with western Europe.

GEOPHOTOMETRIC MAPPING IS NEW SURVEYING METHOD

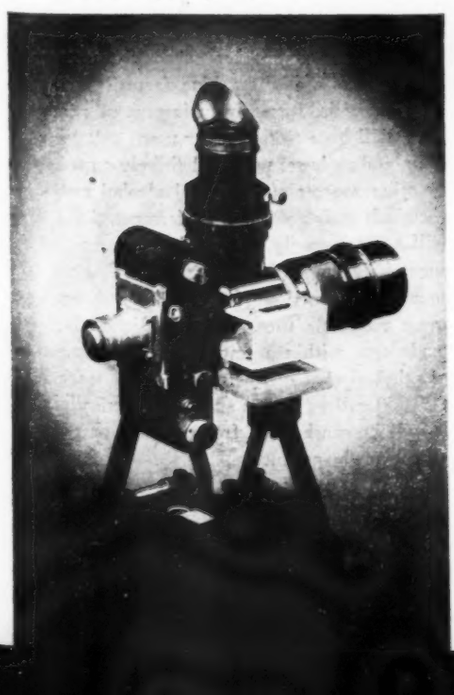
W. O. Bazhaw

A NEW method of surveying, known as geophotometric mapping, particularly adaptable to gravity meter work has been perfected by W. O. Bazhaw, newly-elected vice president of Republic Exploration Co. of Tulsa, with the aid of James R. New. The new method is photographic and consists of recording on film all of the data usually recorded in the instrument man's notebook. Both speed and accuracy are reported to be improved by the new method.

The photographic instrument is mounted in a manner similar to the surveyor's transit and weighs about the same. It is constructed so that a visual check of adjustments may be made in the field using the customary two-peg method and direct stadia distance readings. Any adjustments found necessary may be made in the field easily. The instrument uses 35 mm film with 36 exposures to the roll.

Operation of the instrument in the field does not require the long years of training necessary to develop a skilled surveyor. All the instrument man needs to do is to level the instrument, sight on the rodman and snap the picture. Under average light conditions exposures will run between 1/40 and 1/100 second when using fine grain film. With proper exposure good results may be obtained in cloudy weather. The usual field system of alternate back-sights and fore-sights is used in running extended profiles and traverses. The main requirement for good results is that the instrument must be perfectly level at the instant the picture is taken. This is easily accomplished by watching the level bubble as the shutter is released.

Photographic Surveyor's instrument.



All direct readings in the field are eliminated since both the horizontal and vertical controls are recorded on the same photographic frame at the same time. In other words, the distance, direction and elevation difference are all obtained on one picture with one shot. Compared with the transit this means the elimination in the field of stadia reading for distance, rod reading and vertical angle reading for elevation difference and horizontal angle reading for direction. In an average day's work of 50 instrument setups, 200 field readings are eliminated.

In connection with rough terrain, the need for special terrain corrections for gravity meter stations can be seen visually on the film at the time the traverse is run in the office, thereby disclosing the reason for certain anomalous conditions which might otherwise go undetected if the need for such corrections have been overlooked by the engineers in the field.

The film may also be used to furnish a visual check on the geological outcrops in connection with studies on surface geology. Thus, on exposed stratigraphic sections the elevations, dips, contacts, thicknesses and so forth of the various geological formations may be studied in detail. The same is true in locating, identifying and recording old survey lines, land lines, section corners or other permanent property markers. Enlarged prints of such features would aid in relocating these at later dates.

All measurements in the office are made directly on the film negative using a micrometer reading device of suitable magnification. The micrometer eyepiece now in use makes it possible to measure vertical angle differences to within six seconds of arc as compared to 60 seconds with transit readings taken to the nearest minute of arc on the vertical circle.

In connection wtih vertical angles it should be mentioned at this point that the plane of the film is always parallel with the plane of the rod, which in turn is always at right angles to the line of sight because the instrument is always level for all shots. This condition is not realized with the transit in turning vertical angles because the line of sight is not at right angles to the rod and a secondary correction is needed for precise work.

Stadia distances may be read to an accuracy of $\pm$ 3 feet in 1000 feet with the target spacing now used on the fixed-target stadia rod. Rod levels are also used in the photographic method to make the most of the accuracy that is built into the instrument.

With the lens now in use an overall vertical angle range of 10 degrees is possible with the instrument in the level position, thereby allowing a range of five degrees below or above the HI level line of sight. The vertical angle range of the photographic instrument is a function of the focal length and may be varied over quite a wide range to practically any value desired; however, the greater the focal length, the smaller the vertical angle range and vice versa.

By the elimination of all readings in the field a considerable increase in speed is realized for any given shot. This is especially true where heat waves are present which greatly affect the speed and accuracy of direct visual readings but are "frozen" on the film due to the extremely short exposure time as compared to the low visible-frequency of heat waves. This absence of heat-wave interference on the film is also partly due to the fact that the film is more sensitive to the blue-green region of the spectrum than it is to the red or longer wavelength regions of the visible spectrum.

Chances for error are transferred to the office where there are no adverse weather conditions, heat waves or the interruption of driving from one set-up to the next between readings. If an error is made in the office readings and a traverse fails to close within the allowable limits, the entire traverse may be re-run at any time in the office without the need for sending the field crew and all of their equipment back to the area for a check on their results.

SYNTHETIC OIL FROM COAL

IN a recent symposium on the production of synthesis gas sponsored by the Division of Gas and Fuel Chemistry and the Division of Petroleum Chemistry of the American Chemical Society (New York meeting, September, 1947), the present state of the art of producing liquid and gaseous fuels from coals came in for extensive discussion. Particular attention was given to the preparation of synthesis gas (H_2 and CO_2) as a first step in the manufacture of synthetic gasoline and diesel fuel, along with important quantities of petroleum hydrocarbons to serve as a base for a wide variety of organic chemical products.

Two undercurrents of opinion were noted at the conference. One opinion is that the petroleum industry has an immediate and direct interest in the production of synthetic fuels from coal. The other is that the original method of manufacturing gasoline by the hydrogenation of coal, which was largely employed by the Germans during World War II and later taken up by the Bureau of Mines, is technologically and economically dead beyond hope of resurrecntion.

The existing apparatus and processes for coal and gas conversion were extensively discussed at the ACS symposium. Since the original process of hydrogenating coal appears to be definitely out, the field is left to various forms of the water-gas reaction blended in various ways with the Fischer-Tropsch synthesis which now has been named the "Synthine" process. There are numerous choices, or at least presumptive choices, including treatment of anthracite, bituminous coal, lignite, etc., in lump or powdered form, in fixed, moving or fluidized beds, with air, air and steam, or oxygen and steam, or various combinations of these agents with direct firing or indirect heating to support the reaction.

The fixed bed idea is represented by a pilot plant operated by the Pennsylvania State College and the Consolidated Mining and Smelting Co. of Canada. In an operation similar to that of an ordinary water gas generator, anthracite coal or coke in suitable sizes is treated with a blast of steam and oxygen which produces a gas which, with a slight washing to reduce the CO_2 content, could be used directly for the synthine process. Calculations have indicated that this is a practical, commercial process.

Another fixed-bed system is the Lurgi gas generator, which is an ordinary gas producer adapted to operate under pressure. According to the Bureau of Mines, this generator has concusively proved its value for gasifying brown coal (lignite), subbituminous coals and other non-caking coals. In normal operation at 900°F and a pressure of 22 atm. with oxygen and steam, it produces a synthesis gas mixed with considerable methane, which is welcome in integrated operations where the tail-gases might be used for enriching water gas or as a substitute for natural gas. It is this integrated operation that is beginning to draw the oil industry and the coal industry together in an effort to enable the coal industry to get around some of its limitations.

The gasification of powdered fuel in a fixed fluidized bed is represented by the Winkler process, using oxygen and steam. The fluidized technique is very well known to the oil industry through its large-scale use in the catalytic cracking of oil to produce gasoline. The Standard Oil Co. (N. J.) is interested in the development of this process as a source of synthesis gas. Like the Lurgi process, the Winkler works best on non-caking coals, or coals that are rendered non-caking by a previous treatment.

The gasification of coal in suspension (as distinct from fluidization) is represented by the Koppers process. In this process the powdered fuel is gasified in suspension by a primary supply of oxygen and steam admitted at the base of the generator. As the steam and oxygen blow upward, the necessary amount of oxygen and steam for completing the operation is added at various stages in the generator. This process is independent of the quality of the coal with respect to its composition and caking characteristics, providing it is not too wet or too hard to grind; it seems to be the only process that will handle any kind of coal that meets these specifications. It has certain operating features that require more study. There are a number of other processes.

When the process of producing synthesis gas from coal is finally worked out, it may well be found that, because there are many different kinds of coal, no one process will meet all situations. Perhaps the kinds of coal that will first come into consideration on a major scale will be the lower grades that can be mined cheaply by open-pit methods.

Although the general petroleum industry is naturally interested in the debut which synthetic gasoline from natural gas is soon to make, this interest is mild in comparison with the commotion which has arisen in the organic chemicals industry over the prospect of a flood of chemical products and intermediates that is certain to come in the form of by-products of the synthine process. Although most of the synthesis gas is converted into strictly synthetic petroleum hydrocarbons in the gasoline range, there are also produced notable amounts of oxygenated compounds that are directly or indirectly adaptable to uses in many organic syntheses. It has been found that there will be enough of these by-products to warrant the erection of plants nearly as large and nearly as costly as the synthine plants of which they will be practically integral parts. It is estimated that the chemicals produced from the two proposed Fischer-Tropsch plants may exceed a total of 300,000,000 pounds annually.

The effect on the chemical industry of large quantities of these important organic chemicals from this new basic process is obvious. It will mean a dependable new source of much needed chemicals at prices competitive with those from any other synthetic or fermentation process. It will open up new fields by making available for the first time large quantities of such products as normal propyl alcohol, normal amyl alcohol, propionic acid and butyric acid, and it will stimulate development of new solvents, placticizers, pharmaceuticals, plastics and a host of other chemical products. All of these alcohols, acids, ketones and aldehydes produced by this process are the normal compounds. These normal compounds are generally preferred but heretofore only the lower members of the series have been available in quantity at reasonable prices. In addition a large company that manufactures organic chemicals has contracted to convert some of the primary products from the two synthine plants into other chemicals.

This irruption of new supplies into the chemical markets, which will grow to larger proportions when other projects for applying the synthine process to natural gas and eventually to coal come into operation, is viewed with mixed feelings by the organic chemicals industry. Certain producers see their market taken from them by the products of the synthine factories. Certain raw materials, formerly mainstays of particular lines, will have to find other uses. All forms of grain and molasses will be definitely crowded out by other sources of industrial alcohol and other chemicals now produced by fermentation. This will not necessarily be a hardship on most of the sugar industry, which has begun to find out how to avoid production of molasses or divert it to more profitable uses. The prediction is freely made that within a few years the consumption of ethyl alcohol in this country will reach 200,000,000 gallons a year and that practically all of it will be synthesized from natural or synthetic petroleum by-products.

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International News and Notes

H. S. Gibson

Redwood Medal Award

H. S. Gibson, general fields manager, Anglo-Iranian Oil Co., Ltd., Abadan, has been awarded the Redwood Metal for his unique work on the production of petroleum. The award was announced by the Institute of Petroleum and was presented on September 26 when Mr. Gibson gave an address on "The Production of Oil from Southwest Iran."

Established in 1921 in honor of Sir Boverton Redwood, founder-president of the Institute, the Redwood Medal is awarded "as and when desirable but not more than once in each year, to a petroleum technologist of outstanding eminence, irrespective of nationality or membership of the Institute." Only seven previous awards have been made since the medal was instituted, the last being in 1938.

Mr. Gibson served in the first World War in France, Egypt, Salonica and Turkey and was mentioned in despatches. On demobilization in 1919 he went to Emmanuel College, Cambridge, until 1922 when he joined the (then) Anglo-Persian Oil Co., Ltd. as production engineer, being promoted to production superintendent in 1928 and to production manager two years later. In 1932 he was appointed assistant fields manager (production); in 1944 he became assistant general fields manager (production) and in 1945 was made general fields manager.

He was awarded the C.B.E. in this year's Birthday Honors.

Transferred to London

B. G. Banks has been transferred, after 24 years' service, from the Trinidad refinery of Trinidad Leaseholds Ltd., where he has been refinery manager for the past ten years, to take up the position of assistant to the consulting chemical engineer in the London office. His duties during the war period included the administration of the aviation plant erected by the company in 1940-41 for the Ministry of Aircraft Production. He is succeeded in Trinidad by Mr. J. B. Christian, who has been on the refinery staff there for the past eighteen years.

Mr. Banks received his technical training, which was interrupted by service in the Army, at Finsbury Technical College and on leaving in 1921 was awarded a scholarship by the Salters Institute of Industrial Chemistry. He worked under the late Dr. W. R. Ormandy, after which he was personal assistant to the late Alexander Duckham for a year, during which period he acted as Secretary to he Standardization Committee of the Institute of Petroleum. He is a Fellow of the Royal Institute of Chemistry, the Institute of Petroleum an a number of the Lnstitution of Chemical Engineers.

Export Markets Need Attention

Speaking before the Connecticut Development Commission, Arnold Tschudy, executive vice president of the Council for Inter-American Cooperation, urged manufacturers of machinery and equipment in the United States to give greater consideration to the needs of export markets. In cases where lack of materials prevents the prompt fulfillment of all orders, he advised that a liberal allocation be made for export rather than that such requests be held until all domestic demands can be satisfied.

Referring particularly to Latin American markets in which he is primarily interested, Mr. Tschudy called attention to the growing competition to be met there and warned that it would be a serious mistake to let its markets wait until all domestic orders could be cared for. "Latin America has been doing without industrial products much more than we have," he said. "Postponement of meeting the demand will mean not only the loss of trade now and in the future but serious loss of good-will as well."

Venezuelan Production

Production of crude oil in Venezuela during the month or August amounted to 37,624,136 barrels, an average of 1,213,682 barrels daily. As compared with July, this daily average is higher by 20,024 barrels. Exports for the month were 34,485,353 barrels. Production by companies is shown in the following table:

Company	West	East	Total
Creole	13,777,585	4,760,334	18,537,919
Mene Grande	1,820,493	4,591,482	6,411,975
Shell	10,816,948	—	10,816,948
Consolidada	—	625,580	625,580
Socony	—	872,487	872,487
Texas	117,455	183,056	300,511
B. C. O.	39,490	—	39,490
Orinoco	7,916	—	7,916
Guasare	—	—	—
Phillips	—	346	346
S. A. P. Las Mercedes	—	5,679	5,679
Atlantic	—	5,285	5,285
TOTAL BARRELS	26,579,887	11,044,249	37,624,136
EXPORT BARRELS			34,485,353

Drilling In Morocco

Societe Cherifienne des Petroles, operating in Morocco, reports that of 12 development wells drilled in 1946, seven were producers and the remainder dry. Sixteen exploratory wells were drilled, all dry holes. Exploration is continuing with geophysical crews making surveys in the Rharb basin. Orders for new drilling machinery are being placed in the United States, and American drillers will be employed to instruct native workmen in its operation.

New Tube Standards

Stewarts and Lloyds, Ltd., Upper Brook Street, London, W. 1, have published a booklet dealing with that company's adoption of the new British Standard Specification No. 1387-1947 for gas, water and steam tubes. In a foreword, Stewarts and Lloyds point out the prewer tube standards were based on wrought iron and had not been changed for 80 years. During the war only two grades were made, "lightweight and heavyweight." Now the new standard classifies tubes and tubulars by working pressures.

For ready recognition the company is marking Class A tubes with a brown band near each end. Class B tubes are marked with yellow bands and Class C tubes with green bands. Ungalvanized tubes will be given a protective coating of anti-corrosive varnish. The Stewarts and Lloyds brochure gives a complete listing of sizes, weights, thicknesses, threads and other data regarding the new standards.

Completes South American Outlets

Geotecnica, S.A., Charcas 1775, Buenos Aires, has been appointed representative of Transamerican Factors, Ltd., in Argentina, Chile, Paraguay, Peru and Uruguay according to an announcement by Victor I. Milch, Los Angeles, resident American partner. Goetecnica will represent Transamerican in the sale of Black Magic drilling mud and other equipment. The company will offer well logging service, drilling and coring equipment including the complete line of Engineering Laboratories, Inc., Tulsa.

Transamerican recently has added Texasteel Manufacturing Co., Fort Worth, Western Nipple Manufacturing Co., Los Angeles, and Southern California Tool Co. to the group of companies which it represents in Latin America and the Philippines.

Surveying South-Central Turkey

Turkey's new exploration activities are getting well under way in the south central region. Maden Tetkik ve Arama Enstitusu, the Turkish government corporation for the exploitation of natural resources, has begun operations with two United Geophysical Company, S. A. crews—a gravimeter crew under John T. Barber and a seismic crew headed by Glenn E. Deakins. Both are under the supervision of C. Edwin Riddell, United supervisor for the Middle East. United personnel engaged in the project are W. P. Olmsted, W. L. Klevans, H. G. Osbon, W. B. Muse, R. E. Bradley, H. H. Lamrock, E. E. Evans, Mr. Barber and Mr. Deakins.

Visits Far East

Jay C. Warner, Pacific area regional sales supervisor for Allis-Chalmers export department, general machinery division, is on a six-months trip to the Far East and Middle East to survey conditions and determine sales potentials.

Warner's itinerary will include the principal cities in China, French Indo-China, Siam, Malay States, Burma and India.

Aruba's 1946 Operations

Export of petroleum products from Aruba, Netherlands West Indies, during 1946 amounted to 114,732,942 barrels according to Foreign Commerce Weekly. This was a gain of 8,597,000 barrels over 1946. Of the shipments 54 percent went to the United States, 33 percent to Europe and 12 percent to South America. Crude runs to stills totalled 122,877,759 barrels. Of the refined products exported 66 million barrels consisted of residual fuel oil and approximately 20 million barrels of motor gasoline, with diesel oil, distillate and kerosene making up the bulk of the remainder.

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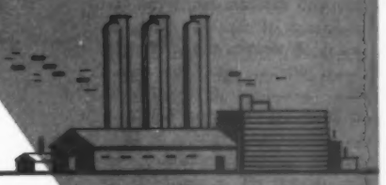

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New Dutch Refinery

Plans for the construction of a new refinery near Rotterdam, Holland, have been announced by Caltex Petroleum Maatschappij (Nederland) N. V., a subsidiary of the California Texas Corp. Approximately 160 acres are under long-term ground-lease at Pernis on the Rhine River, four miles to the west of Rotterdam.

The refinery, costing about eighteen million dollars, is designed to have a capacity of 20,000 barrels per day and will manufacture motor gasolines, diesel gas oil, fuel oils, and SO^2 treated kerosenes for distribution in Holland, Belgium and Luxembourg. Arthur G. McKee and Co., Cleveland, have contracted for the engineering and construction, except tanks. Completion is scheduled for 1950.

Negotiates for Philippines Concession

Standard-Vacuum Oil Company, commenting on press reports from Manila, confirmed that it continues to be interested in negotiating with the Philippines government on the matter of oil exploration in the Philippines. P. W. Parker, chairman of the board, said that discussions which began some ten years ago and which were interrupted by the war were resumed earlier this year.

"A special commission recently appointed by President Roxas is now making a study of the problems relating to the exploration and development of the oil resources of the Philippines for the purpose of making recommendations to the President regarding a national oil policy for that country," Mr. Parker stated.

Exploration in Italy

Exploratory work on the Italian peninsula is underway in four zones (1) the Lombardy region, (2) the Ferrara district, (3) the Tuscan region and (4) the Sicilian territory.

Oil researches in Lombardy are conducted by the Azienda Generale Italiana Petroli (AGIP) and are centered in the Lodi district near Caviago and in the Piacenza district near Podenzano and San Giorgio. While exploration in the two last mentioned villages has not disclosed any important oil deposits, five wells have been drilled in the Lodi district and a sixth is underway at Rifalda near Crema. At 1,500 meters with an opening of 5mm. an output of 43,000 cubic meters of gas has been obtained. Drilling will continue at this point as the rig employed is able to go to a depth of 3,000 meters. It is reported that AGIP has received offers from British oil concerns to cooperate in the oil search in the Lodi district.

Exploration in the Ferrara district is carried out for the Societa Petrolifera Italiana, a subsidiary of Standard Oil Company (N. J.). The whole zone from Padova to Bologna along the Adriatic through Rovigo and Ferrara has had important methane manifestations which support the possibility of oil production. The results of the geophysical surveys are not disclosed but a statement has been made to the press by the managing director of SPI to the effect that failure to find oil heretofore in the Po Valley does not mean that that the territory does not possess such resources. Meanwhile the announcement is made that Standard Oil Company (N. J.) has applied officially to the Italian government for a concession in the Ferrara district. There are also reports of plans to build a refinery at Ferrara to handle Middle East oil destined to the Italian and Central European markets.

In the course of an interview granted to the press Engineer Boccalery and Signor Borrego of the Western Geophysical Company which has been conducting exploration for the Standard subsidiary pointed out that while no oil discoveries, such as have been rumored, have been made extensive gas deposits have been located the existence of which indicates that at greater depths it may be possible to find oil. As a matter of fact, as has been disclosed at the depth of 300/400 meters only, and during July 1947 there has been an output of 9,000,000 cubic meters which means a yearly output of 108 million cubic meters which may be increased to 10,000,000 cubic meters daily. Signor Borrego believes that at the depth of 2,000/2,500 meters there should be important oil resources.

In connection with these developments it should be noted that in the meantime the Italian government has worked out a scheme to increase the imports of oil and petroleum products from a total of 4.8 million tons in 1948 to a total of 6.2 million tons in 1951.

Oil search in the Tuscan region is being carried out by the Societa Idrocarburi Nazionali, a subsidiary of the La Centrale Electric Company, which operates some wells at Pietramala at depths varying between 1,000 and 1,500 meters and has just brought another well on the Appenines in the Forli district. In Sicily the MacMillan Petroleum Company has put down test wells at Trapani and Licata which are to be carried to a depth of 3,500 meters.

Reprints WP Article

Manchester Oil Refinery, Ltd., has published a beautifully illustrated 16-page booklet in which is reprinted an article from the 1946 refinery issue of WORLD PETROLEUM. The article in question recounted the accomplishments of the Manchester plant during the stress of the late war and is titled "A British Refinery in Wartime."

Philippine Representative

A. C. Delgado has been appointed Philippine and East Indies representative of Transamerican Factors, Ltd., according to an announcement by Victor I. Milch, resident American partner, Los Angeles. Mr. Delgado's offices are in the Insular Life Building, Manila. He is a graduate of Santo Tomas University at Manila and during the war was an engineer on General MacArthur's staff.

Netherlands Production Grows

Production of crude oil from the Schoonebeck field in the Netherlands rose to 62,646 metric tons (approximately 440,000 barrels) in 1946 as against 5,851 tons (41,000 barrels) in 1945. During the year 19 wells were drilled, of which three, including one exploratory well, were dry holes.

Stockholders Visit Factory

More than 500 stockholders of British Insulated Callender's Cables, Ltd., visited the company's Prescot works following the recent annual meeting. A special train from Liverpool was arranged on short notice when so many accepted the invitation of Chairman Sir Alexander Roger. Visiters toured the works in small groups.

Three New YPF Directors

The Argentine government has accepted the resignation of three of the directors of its oil concern YPF and has appointed three ex-employees as directors. The new first vice president Ing. Julio V. Canessa, who is at present in charge of the organization because of sickness of General Albariño, is also retaining his position as general director of the Direccion del Gas del Estado. General Albariño is not expected to return to duty.

Ing. Canessa, soon after his graduation from the University of Buenos Aires as a civil engineer, entered the services of the La Plata refinery in 1927 as shift superintendent. In 1928 he was appointed head of the gasoline plant and in 1931 was sent to the United States to study the LPG industry. In 1938 he was put in charge of the new San Lorenzo refinery as general manager. In 1940 he was transferred to the Direccion General and entrusted with the studies related to the construction of the Mendoza-San Lorenzo pipeline, in connection with which he again went to the United States. In 1943 he took charge of all matters related to the nationalization of the gas industries in Argentina, and when the government took over the Cia. Primitiva de Gas, the English concern which had the manufactured gas service of the city of Buenos Aires, he was appointed head of the newly-created gas department of YPF, and in 1946 when the government created the Direccion del Gas Estado, St. Canessa was promoted to general director.

Another of the new directors of YPF is Ing. Federico Ramos Ruiz who also entered the services of the La Plata refinery of YPF in 1927 together with Ing. Canessa soon after his graduation as civil engineer. In 1928 he was in charge of the La Plata cracking plants and in 1932 was transferred to the Direccion General as engineer in the newly-created manufacturing department. In 1933 he was promoted to technical secretary of the general manager and in 1935 was sent to the United States to study petroleum production practices. Upon his return in 1936 he was appointed production engineer of the Comodoro Rivadavia fields, and in 1943 was promoted to assistant manager of the YPF production department. In 1946 he was appointed manager of the production department and at the beginning of 1947 went to New York to take charge of YPF's purchasing department. In June he resigned from YPF to take charge of the Direccion General de Usinas del Estado (Bureau of Power Houses of the State) as general director. He keeps his position in the Bureau of Power Houses while acting as director of YPF.

The third director of YPF is Sr. Carlos Lucero Flores who is also retaining his position as director of the manufacturing department of the Direccion General del Gas del Estado. Sr. Lucero Flores entered the services of YPF in the refinery of Comodoro Rivadavia soon after his graduation from the school of mines of the State of San Juan. In 1933 when YPF started operation of its lubricating plant at La Plata, he was placed in charge of the dewaxing plant, and in 1935 he was made lubricating plant superintendent. In 1936 he was transferred to the San Lorenzo refinery as operating superintendent. In 1939 when YPF built the Salta refinery, Sr. Lucero Flores was appointed general manager, and in 1941 he was transferred to San Lorenzo as general manager of the refinery. In 1946 he was entrusted with all matters relating to the manufacturing end of the Direccion del Gas del Estado.

Production in Iran

Crude production in Iran for the month of June is reported by Anglo-Iranian Oil Co., Ltd., as 1,821,000 tons (14,021,000 barrels). For the first six months of 1947 production is given as 9,399,000 tons (roundly 72,372,000 barrels).

Will Make Chemicals From Petroleum

Press reports published in London state that Anglo-Iranian Oil Co., Ltd., jointly with Distillers, Ltd., will organize a company to manufacture basic industrial chemicals from petroleum. In addition to a regular line of chemicals, the company is expected to engage largely in the manufacture of detergents, demand for which is growing rapidly.

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GATX GENERAL AMERICAN

INTERNATIONAL "CO-OP" MEETS IN LONDON

London—

FIRST attempt to organize petroleum consumers at the world level was completed at a recent meeting of the directors of the International Cooperative Petroleum Association at London, according to Howard A. Cowden of Kansas City.

"It is only natural that the cooperative petroleum development should be organized on an international scale," Mr. Cowden said. "The world's industry and agriculture move on oil, and no nation can hope to achieve a decent standard of living for its people without ample supplies of refined fuels at reasonable prices. These will be the twin objectives of the ICPA," he pointed out.

Applications for membership were received at the meeting from twenty-three central cooperatives in Australia, Belgium, Canada, China, Cuba, Czechoslovakia, Denmark, Egypt, France, The Netherlands, Norway, Palestine, Poland, Scotland, South Africa, Sweden, Switzerland and the United States.

"This international association," Cowden declared, "will engage ultimately in every phase of the industry, acquiring its own crude oil resources, pipelines, tankers and refineries. It will begin operations with an authorized capital of $15,000,000 and establish headquarters in New York, with a branch office in London eventually."

Cowden, who heads the largest cooperative in the United States, was not discouraged over the fact that the Economic and Social Council of UN had turned down the proposal advanced last month by the International Cooperative Alliance. The proposal was that control and administration of Middle East oil resources be handled by a commission of United Nations "by and with the consent of the state involved."

"It was disappointing, of course," Mr. Cowden said, "to find a representative of the British labor government and one from our own State Department leading the fight against the ICA resolution and in favor of bigger and better oil cartels. It only means that present tension in Middle East oil arrangements will continue and may in time lead to serious trouble among the great powers.

"Yet I think I understand why these two countries opposed us," he continued. "Between them the nationals of the United States and Britain hold 90% of the world's oil resources, exclusive of Russia, and they account for a similar percentage of the international trade in oil. They have very considerable joint holdings. They are authors of the Anglo-American oil agreement now awaiting ratification by both countries. As an integral part of that agreement is a set of reservations prepared by the American Petroleum Institute, trade association of the U. S. oil industry, which will have the effect of bypassing United Nations by denying any UN commission any power to regulate the big oil companies in the Middle East in the public interest. That's why both governments did not support the resolution advanced by this people's movement which embraces some 85 million member families in 39 countries."

Cowden is convinced that popular demand for something better than oil imperialism in the Middle East will not be stilled by this single defeat before UN. As he views it, nothing short of equality of access to oil supplies there, as is contemplated in the Atlantic Declaration, can ever lift petroleum out of its present role as the greatest troublemaker in international commerce. "Pressure for the UN oil authority will continue," he promised, "as the ICPA directors reaffirm their position in favor of such action."

Albin Johansson, Stockholm, is president of the ICPA; John Davidson, Scotland, vice president; Howard A. Cowden, United States, secretary; other directors are: A. J. Cleuet, France, and H. A. Rudin, Switzerland: Lloyd R. Marchant of Omaha, Nebraska, was employed as general manager.

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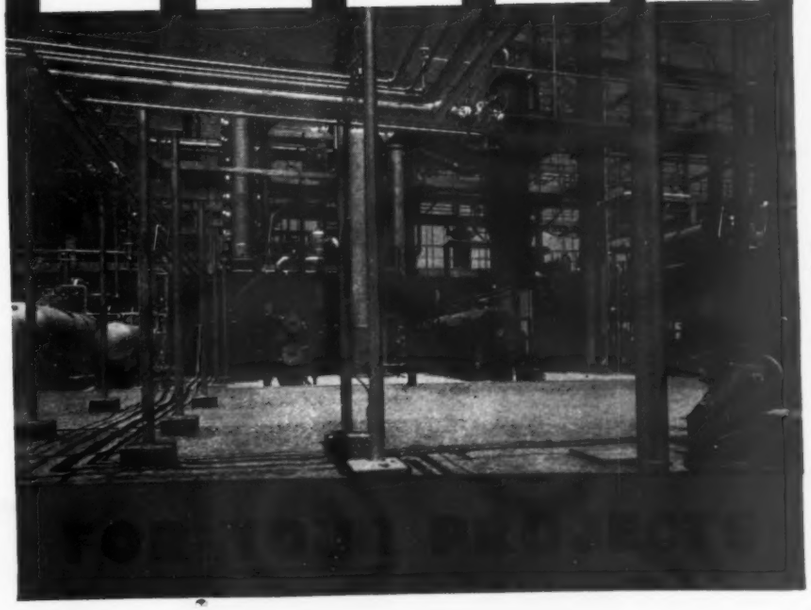


Modern Sulfur Dioxide treating unit recently completed by Badger for General Petroleum Corporation.

OIL COMPANY STAFF CHANGES

Edward L. Shea

Hugh W. Field

EDWARD L. SHEA has been elected president of the Ethyl Corp. to succeed Earle W. Webb, who becomes chairman of the board. Mr. Shea resigned as executive vice president of Tide Water Associated Oil Co. in 1939 when he was elected president of The North American Company.

A graduate of Princeton, he began his career in the oil business in 1916 at the Bayonne, N. J., refinery of Tide Water and after serving as a naval aviator in World War I returned to the company as a salesman. After various assignments he was elected vice president in 1925 and for the next six years was in charge, first of manufacturing, and then of sales. Two years after his appointment in 1931 as executive vice president he was elected president of Tide Water. When Tide Water Oil and Associated Oil Company merged and elected William F. Humphrey of Associated as president, Mr. Shea was named executive vice president of the new company. Three years later he resigned to accept the presidency of The North American Company.

Mr. Webb has been associated with Ethyl Corp. since its inception and president for twenty-two years. He was one of the original directors of General Motors Chemical Company, which was incorporated in 1923 to handle the manufacture and sale of "Ethyl" antiknock compound after the antiknock properties of tetraethyl lead were discovered by the late Thomas Midgley, Jr. In January, 1928, Mr. Webb and Mr. Shea, then vice president of Tide Water Oil Company, signed the first contract for the manufacture and sale of Tydol "Ethyl" gasoline, which gave the Ethyl Corp. substantial distribution in the Northeast.

DR. T. G. DELBRIDGE retired October 1 after 38 years' service with The Atlantic Refining Company. He has been manager of the research and development department since 1924. Succeeding him as manager of the department is Hugh W. Field, an Atlantic director and assistant manager of the department for the past seven years.

Dr. Delbridge entered the employ of the company on June 7, 1909, as a works chemist and in the following years became nationally known for his work in the field of petroleum chemistry. He is a past president of the American Society for Testing Materials and a member of various scientific organizations. During World War II he was active on various industry committees serving the government.

Mr. Field joined Atlantic in 1928 as a member of the research department after receiving a degree in chemical engineering from the University of Pennsylvania. He was elected a director of the company last year and was appointed a member of the manufacturing committee. During the last war he was a member of the PAW Aviation Gasoline Committee of District No. 1, chairman of the Synthesis Subcommittee of the Technical Advisory Committee to the Petroleum Industry War Council and was selected as one of a group of four men to tour the United States to expedite the production of aviation fuel for the armed forces.

R. M. MORRISON general purchasing agent of The Texas Co., since 1944, has been appointed manager of the purchasing department. He succeeds R. S. Hatch who goes to Arabian American Oil Co. Philip Hauck succeeds Morrison as general purchasing agent. W. G. Taylor replaced Hauck as divisional purchasing agent, Chicago, and F. G. Schlemmer, of Los Angeles, becomes northern division purchasing agent at New York to succeed Mr. Taylor.

R. M. Morrison

Mr. Morrison entered the oil business in 1914 as a roustabout for the Montebello Oil Co., Fillmore, Calif. Later he was employed by Tay Pike Oilwell Supply Co. and Ventura Refining Co., Los Angeles. In 1926 he became buyer and assistant purchasing agent of California Petroleum Corp., retaining that position when Calpet was acquired by Texaco. In 1939 he was transferred to New York as purchasing agent and became general purchasing agent in 1944 Until recently he was chairman of the oil buyers' group of the National Association of Purchasing Agents, which position he has held since 1944.

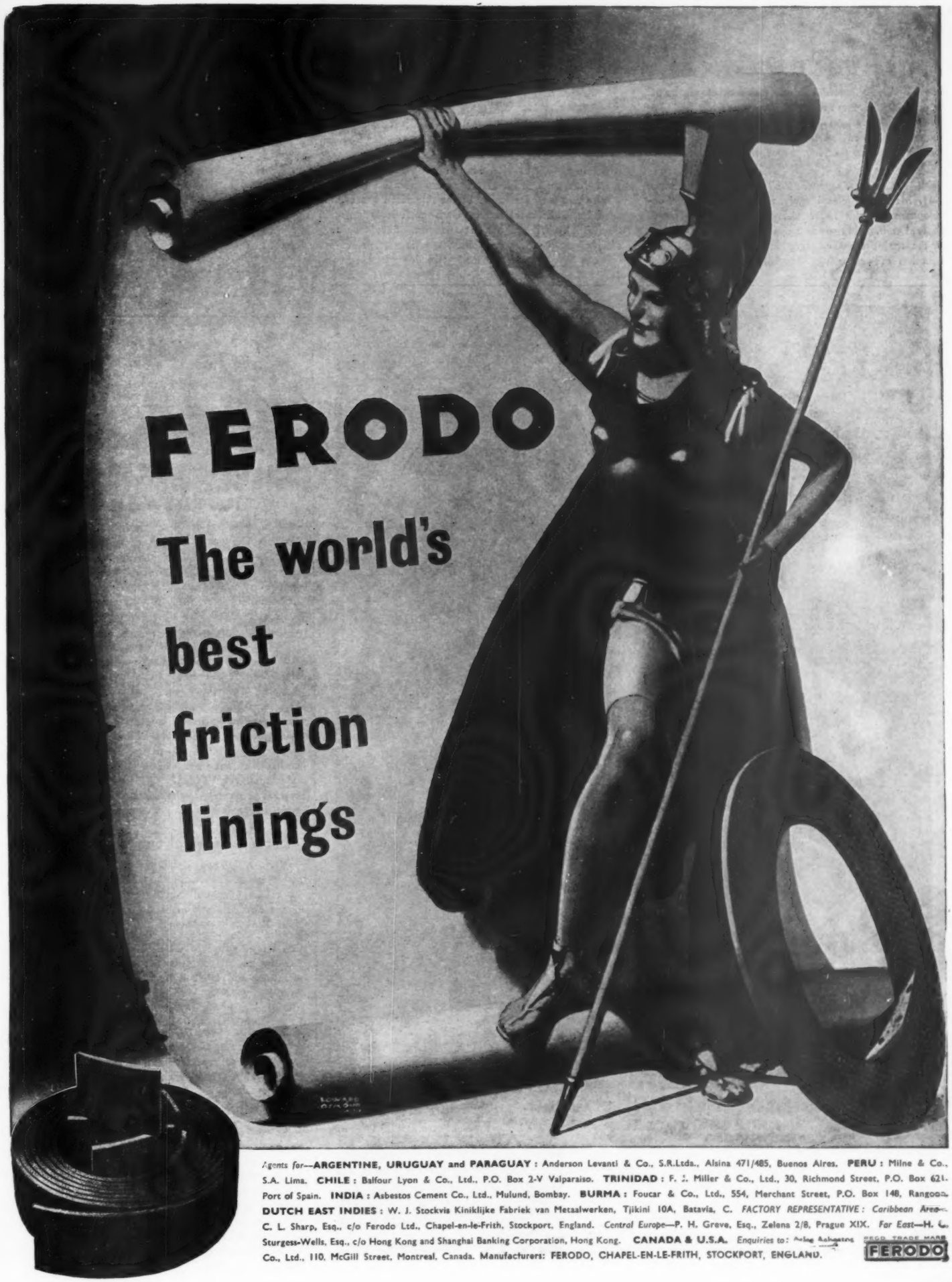
E. V. MURPHREE, executive vice president, has been elected president of the Standard Oil Development Co. to succeed Robert P. Russell, who resigned to become technical consultant to International Basic Economy Corp. of 30 Rockefeller Plaza, New York. Mr. Murphree has contributed to many of the company's technical developments. These include the fluid catalytic cracking process, a process for synthesizing toluene and a catalytic process for making butadiene.

Mr. Murphree joined Standard (New Jersey) in 1930 as a director of a new technical group engaged in developing chemical process from petroleum raw materials. Within two years he became director of research and development at the Esso Laboratories in Baton Rouge, La., and in 1934 was elected vice president and a director of the Hydro Engineering and Chemical Co., a Jersey Standard affiliate in New York. He succeeded to the post of manager of research and development for the Development Company in 1936, was appointed vice president in 1938 and became executive vice president in 1946.

During the war Mr. Murphree served with the Office of Scientic Research and Development as a member of the S-1 Executive committee headed by J. B. Conant. The committee was instrumental in the establishment in August, 1942, of the Manhattan Project which developed the atomic bomb.

Mr. Russell, who joined the Development Company in 1927, became vice president in 1934 and president in 1944. For outstanding service during the war, particularly in the Development Company's work in the fields of flamethrowers, incendiary bombs and smoke generators, Mr. Russell received the Medal for Merit, highest United States award to a civilian, and the Medal of Freedom for conspicuous services in connection with military operations in a war theatre.

E. V. Murphree



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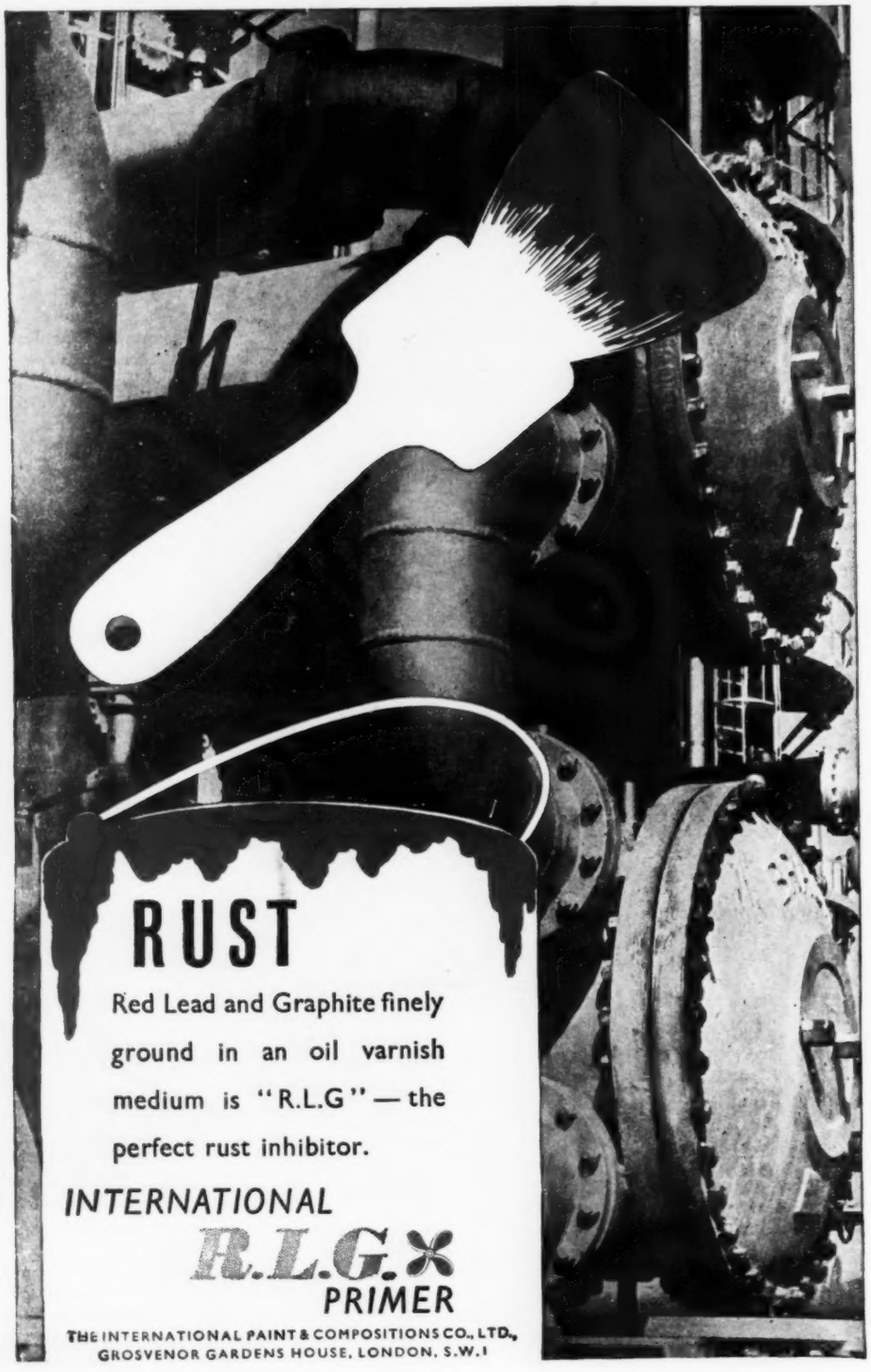
"Pete" Fluor Dies

Peter E. Fluor, president and chairman of the board of directors of the Fluor Corporation, Ltd., Los Angeles, passed away suddenly on September 10 at his home in Anaheim, California. Death was due to coronary thrombosis. Mr. Fluor was 52 years old.

With the company since 1915 and president since 1943, Mr. Fluor was largely responsible for the development of the Fluor Corporation from a small, general contracting concern to its present status as one of the major firms engaged in the design and construction of processing plants for the oil, gas and chemical industries with activities international in scope.

Born in Oshkosh, Wisconsin, in 1895, "Pete" Fluor came to California in 1912. He served during World War I as a Lieutenant in the Army Air Force. Much of his army career was spent as a pilot on active duty in France. It was after his discharge that he entered the construction field. He was active in oil industry affairs and was a member of the American Petroleum Institute, California Natural Gasoline Association and the Western Oil and Gas Association. Survivors are his widow; a son, John Robert, who is vice president of the Fluor Corporation; two daughters; two brothers, Fred C. Fluor, a director of the company, and J. S. Fluor, Jr., of Santa Ana; two sisters and three grandchildren.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Jack F. Knight

New Reed Appointment

Jack F. Knight has been promoted to manager of sales development of the Reed Roller Bit Co., Houston, Texas. In his new work he will have charge of all promotional activities, both within the sales organization and among customers. In his sales promotional work he will, through close integration of sales and advertising efforts, provide Reed customers with helpful information.

After graduating from Texas University, Mr. Knight started with the Reed Roller Bit Company in the shipping department at Houston. He was soon advanced to field warehouseman. His next advancement was to territorial salesman serving successively in various major oil fields. Later he was assigned to supervisory control of finished goods and then to production manager. In 1945 he became assistant sales manager under R. G. Hamaker, vice president in charge of sales, who continues to direct all sales activities.

Rockwell International Official Named

Col. A. E. (Cappy) Higgins has been named vice president of the Rockwell International Corp., New York City. He will have responsibilities in both the export and domestic marketing of products of the various Rockwell divisions.

Col. Higgins first joined the U. S. Army in 1915. In 1927 he left the Army to join the American Gas Association, and in 1937 he resigned to join the Pittsburgh Equitable Meter Division of the Rockwell Manufacturing Company.

Col. Higgins re-entered the service in 1942 and served tours of duty at U. S. and Pacific air bases. His last post before retirement was as commanding officer of Hickam Field, Pearl Harbor, Hawaii.

Lyne Is Houston Manager

John A. Lyne, former chief field engineer for The Parkersburg Rig and Reel Company, has been appointed Houston plant manager. He succeeds G. E. Dake, deceased. Mr. Lyne has been a member of the Parkersburg organization for 23 years. In his previous assignment as chief field engineer, he spent considerable time in foreign as well as domestic fields. He has recently returned from a five months' tour of Middle Eastern oil operations.

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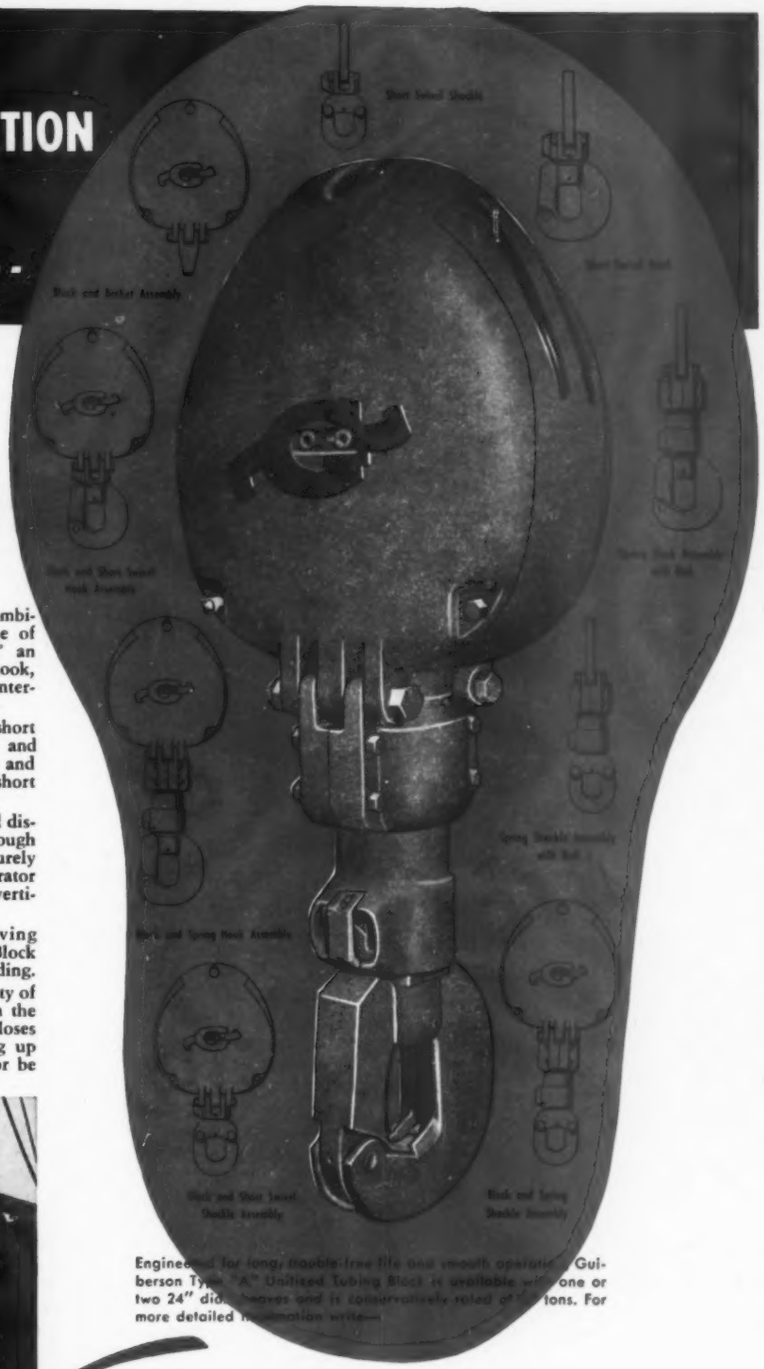

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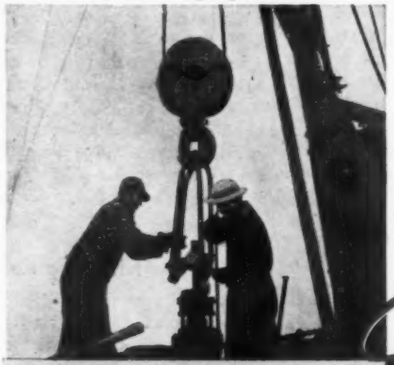

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C. Stribling Snodgrass

C. STRIBLING SNODGRASS, a director of Bechtel Corp., will now serve as vice president in charge of engineering, according to an announcement by S. D. Bechtel, president. Mr. Snodgrass will have charge of all engineering and development activities, with emphasis on the design and engineering of refineries and chemical plants. He will continue as vice president and director of Bechtel International Corporation and as a director of International Bechtel, Inc. He will make his headquarters in San Francisco, hub of Bechtel engineering operations directed by C. C. Steward, chief engineer. Mr. Snodgrass joined the Bechtel interests in February, 1946 following five years with the Petroleum Administration for War as director of the foreign refining division.

E. HEARN SIMPSON has been appointed assistant sales manager of petroleum additives for the duPont Company. His advancement to the new position results from the duPont entry into the sale of tetraethyl lead to the oil refining industry which will be inaugurated on Jan. 1, 1948.

R. L. JOHNSON has been appointed superintendent of the Sunray Oil Corp. refinery at Duncan, Okla., which was recently purchased from War Assets administration. He formerly was superintendent of the company's refinery at Santa Maria, Calif., where he has been succeeded by E. D. Ford, his former assistant. Mr. Johnson built the Sunray plant at Allen, Okla., in 1921 before it was bought by Sunray and managed it until his transfer to California in 1946.

Moves Offices

Attapulgus Clay Company and Porocel Corporation have moved their executive, sales and general offices from 260 South Broad Street, Philadelphia, to 210 West Washington Square, Philadelphia 5, Pennsylvania. The new telephone number is WAlnut 2-5720 and the cable address "ATTACLAYCO." This move was necessary in order to accommodate increased personnel.

Schreiner Succeeds Moffatt

G. Reed Schreiner has been appointed director of advertising, United States Steel Corporation of Delaware, to succeed Charles R. Moffatt who retired September 30. A life-long resident of Mt. Lebanon, Pa., Mr. Schreiner graduated from the University of Pittsburgh in 1916 with a B.A. degree. He began 28 years of service in advertising departments of U. S. Steel subsidiaries when he was employed by Carnegie Steel Company in 1919. He was made assistant advertising manager of Carnegie-Illinois Steel Corporation in 1936 and was promoted to advertising manager two years later. In 1947 he became assistant director of advertising of the Delaware Corporation.

Mr. Schreiner is a director of the Pittsburgh Advertising Club and a member of the Industrial Advertising Council of Pittsburgh, Chapter of the National Industrial Advertising Association. He served in the United States army during World War I.

New Pemex Refinery

Arthur G. McKee & Company, Cleveland, Ohio, has been awarded a contract for the design, engineering, purchasing and construction of a complete new petroleum refinery for Petroleos Mexicanos at Salamanca, Mexico. The refinery will consist of a 30,000-barrel crude distillation unit, gas oil thermal cracking unit, 30,000 KW electric power generation plant with boilers and water treating and other auxiliaries, Ethyl blending equipment, shops, warehouses, tankage and all other facilities needed for a complete modern refinery. It is estimated that this new refinery will cost approximately $12,000,000. Construction work will start in 1948, and the project is scheduled to be completed sometimes in 1949.

Directing this project for Petroleos Mexicanos in Mexico will be Senator Antonio J. Bermudez, A. M. Amor and Jose Colomo, who are general director, subdirector and head of coordination, respectively, of Petroleos Mexicanos. The Cleveland representative of Petroleos Mexicanos will be Rafael Ortiz Mena, who represented Petroleos Mexicanos in this country in connection with the refinery installations McKee recently completed at Atzcapotazlco for the same company.

New Cycling Plant Planned

Plans have been completed by the operators in the Burnell-North Pettus field for the construction and operation of a cycling plant to be located in Bee County, Texas. The cycling plant will be operated by Stanolind Oil and Gas Co.

This plant is designed to handle 150,000 MCF per day of high-pressure gas and return 120,000 MCF per day to the formation. An additional 7,000 MCF of casinghead gas now being flared will be processed through the plant and sold to the United Gas Company, together with sufficient high-pressure gas to supply their requirements. The design and construction is being handled by Jones & Laughlin Supply Company, and actual field construction is expected to start in the spring of 1948. The main absorber will operate at 1,600 psi and gas will be injected at a maximum pressure of 3,400. A total of approximately 7,000 barrels per day of products will be produced which will consist of propane, butane, motor fuel, kerosene and fuel oil.

Selective Blending Improves Fuels

Improvements in performance of motor fuels is possible through selective blending of various fractions, according to a research report at the midwest regional meeting of the American Chemical Society, presented by T. H. Risk, J. F. Jordan, M. L. Alspaugh and J. D. Fuller of Ethyl Corp. The experiments were undertaken at Ethyl's Detroit laboratories to determine the manner in which a motor fuel's antiknock performance on the road is affected by two factors: sensitivity to altered engine conditions brought about by changes in speed, and susceptibility to improvement by tetraethyl lead.

The investigations showed that by proper blending fuels can be made which have both good sensitivity and good lead susceptibility. Motor fuels of this type not only respond uniformly over the speed range to additions of tetraethyl lead, but usually have better lead susceptibility on the road at all engine speeds than their laboratory octane numbers would indicate, it was said. Analyses indicated that such fuels are obtained by concentrating olefins in the lighter fractions and keeping the olefin content of the heavier fractions as low as possible.

New Marketing Company

Beacon Petroleum Co., a new marketing company which will specialize in natural gasoline, LPG and LPG equipment has been organized at Tulsa by E. Q. Beckwith, J. S. Feroe, H. R. McFarland and R. E. Bolinger, all of whom were formerly with Anchor Petroleum Co. and Anco Manufacturing & Supply Co. Mr. Beckwith, president of the new company, was with Phillips Petroleum Co. for 15 years in engineering and LPG procurement operations. Mr. Feroe was with Hanlon-Buchanan for 14 years prior to its sale to Warren and recently has been assistant to the president of Anchor. Both Mr. McFarland and Mr. Bolinger have had many years' experience in engineering and supply matters.

Opens New LPG Offices

Warren Petroleum Corp. has opened an LPG sales office at 60 Park Place, Newark, New Jersey, with C. L. Hulswitt, formerly manager of the Detroit office, in charge. Sales of LP-Gas by Warren in the eastern section of the United States are made possible through tankship movement of products from the Texas Gulf Coast to a new marine terminal now under construction at Newark. The S. S. Natalie O. Warren, special tankship, will transport over 1,300,000 gallons of propane per trip and will be loaded at Warren's terminal at Norsworthy, Texas, (near Houston). It is expected that tank car and truck deliveries from the Newark terminal will be started early in December, 1947.

New Sohio Plant

Standard Oil Company of Ohio has placed the designing of a fluid catalytic cracking unit and a gas recovery system with Universal Oil Products Company. These units are to be installed in Standard's Lima, Ohio, refinery, and Arthur G. McKee & Company of Cleveland, is the general contractor. The catalytic cracking unit will have a design capacity of 16,000 barrels of fresh charge per stream day and will process gas oil from Illinois and West Texas crudes. The unit is being designed for wide flexibility in operation, which will make possible the processing of a variety of stocks. The installation is part of an extensive program for modernization of the company's refineries.

New Montana Refinery

Continental Oil Company will build an oil refinery at Billings, Montana, to cost approximately $8,500,000 according to H. G. Osborn, vice president in charge of manufacturing. Contract for construction of the 7,500-barrel plant has been signed with the Jones & Laughlin Supply Company. Construction work will start in the spring of 1948.

Units for catalytic cracking, catalytic desulfurization, polymerization and solvent extraction of asphalt will be built. Crude will come from Continental's Frannie, Elk Basin, South Elk Basin and Cat Creek properties where there is ample current production and reserves to assure continuous and long-range operation.

James T. Duce, vice president of Arabian American Oil Co., as he appeared recently before the Senate Small Business Committee hearing at Washington, D. C. Mr. Duce testified that he had never attempted to influence Congress or the executive branch of the government in favor of the proposed Transarabian pipe line. He said that he had appeared before government agencies to present pertinent facts as any business man is entitled to do. Harris & Ewing photo.

DAVID GORDON has been elected president of David Gordon & Co., Inc., chemical, mechanical and industrial engineers, New York. He formerly was executive vice president. Prior to organization of the present company, Mr. Gordon was with The M. W. Kellogg Co.

R. C. GUNNESS has been appointed manager of the research department of Standard Oil Company (Indiana), and T. H. Rogers has been promoted to director of research. J. K. Roberts, general manager of research will continue to have general supervision over all research department activities.

Dr. Gunness served as assistant professor in the chemical engineering department of M.I.T. for two years before joining the Standard research staff in 1938 as a group leader. In 1945 he was made associate director of research, heading the process-design and pilot-plant division of the research department.

Dr. Rogers served in the Chemical Warfare service during World War I, and, after experience with the Bureau of Mines and the Du Pont Company, joined the Standard of Indiana research staff in 1922. He became an associate director of research in 1938 and has been particularly active in research on gasoline, distillate guels and motor oils. Dr. Rogers is one of the scientists who received the Modern Pioneer's award from the National Association of Manufacturers in 1940.

ROBIN DOUGLAS, advertising manager of General American Transportation Corporation, Chicago, flew to the Isle of Capri in September to visit his father, famed British writer, Norman Douglas, author of "South Wind." This was their first meeting in twelve years.

GEORGE ARMISTEAD, JR., consulting chemical engineer for the petroleum, chemical and related industries, has moved his offices from 1519 Connecticut Avenue to Suite 712, 1200 Eighteenth Street, Washington 6, D. C.

Robert S. Warren

Joins Guiberson

Robert S. (Bob) Warren has recently joined the Guiberson Corporation of Dallas as Houston district sales representative. For the past nine years he was with Thornhill-Craver as Houston sales representative, and prior to that with Mid-Continent Supply Company. W. D. Koons, sales and service representative in the Houston office of the company for the past year, will remain in his present capacity.

N. VAN WINGEN, associated with the Richfield Oil Corporation, Los Angeles, since 1938, has resigned to join the faculty of the University of Oklahoma as a professor of petroleum engineering.

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Col. J. C. Raaen

COLONEL J. C. RAAEN has been appointed general manager of Universal Oil Products Company laboratories at Riverside, Ill., according to an announcement by David W. Harris, president of the company. Because of the attention devoted to research by Universal and the wide range of its investigations, this is considered one of the most responsible and important positions in the company's organization.

Col. Raaen comes to Universal after 29 years in research and development work for the Ordnance Branch of the U. S. Army. A native of Minneapolis, he spent his early years in Chicago and was appointed to West Point from the First Illinois District. After completing his course at the Academy in 1918, he received a B.S. degree from the Massachusetts Institute of Technology and later pursued courses at the Infantry School, Fort Benning, Ga., the Ordnance School, Watertown Arsenal, the Command and General Staff College, Fort Leavenworth and the Army Industrial College, Washington.

Col. Raaen's research and development activities for the Army included assignments to Watertown Arsenal, Aberdeen Proving Ground and Watervliet Arsenal, and he supervised the construction of plants for the manufacture of arms and ammunition in the recent war. He served as executive officer to Gen. L. A. Campbell, Chief of Ordnance, and subsequently was made commanding officer at Watervliet Arsenal. He received the Legion of Merit and the Distinguished Service Medal for his services in connection with the war.

C. G. Gerhold, formerly manager of the Riverside laboratories, has been made assistant to Edwin F. Nelson, vice president, and he will coordinate all research and technical activities of Universal.

BURL S. WATSON, president of Cities Service Oil Co. of Pennsylvania, has been elected president of the newly-formed Citcon Corp. which will build a $30,000,000 lube plant at Lake Charles, La. He will continue to serve the Pennsylvania company and Petroleum Advisers, Inc., as president, and the parent Cities Service Co. as vice president and director.

Mr. Watson joined the Cities Service organization as a cadent engineer at Toledo, Ohio, in 1917. He was valuation engineer at New York offices for a number of years, and in 1925 was made assistant to the manager of utilities. In 1928 he was made assistant to W. Alton Jones, who was then first vice president of Cities Service Co. He was general manager of real estate and supervised construction of 60 Wall Tower in 1930. In 1945 he became assistant to the president of Petroleum Advisers and the following year was elected president.

Other major officers of the new corporation are Chairman W. Alton Jones, president of Cities Service; Vice President Harold Osborn, vice president for refining of Continental; and Vice President A. P. Frame, vice president of Petroleum Advisers.

ROLAND V. RODMAN has been elected president and a director of Anderson-Prichard Oil Corporation. L. H. Prichard, the former president, will continue as a director and has been elected chairman.

Mr. Rodman joined The Bay Petroleum Corporation as general counsel in 1937 after 18 years in general law practice. He was made vice president and general manager in 1939 and was elected president in September, 1946. Bay is an integrated company with refineries in McPherson, Kan., Denver, Colo., and New Orleans, and producing properties throughout the Mid-Continent.

Mr. Prichard has been president of Anderson-Prichard since its organization in 1922. Originally operations were confined to a small refinery located in Cyril, Okla. Under Mr. Prichard's executive leadership the corporation has become one of the largest integrated independents in the petroleum industry.

L. G. Smith

L. G. SMITH has been vice president in charge of refining of Creole Petroleum Corp. Mr. Smith has been active in the petroleum industry since 1913. He was appointed general manager of the Lago Oil and Transport Company, Ltd., Aruba refinery in 1933 and was elected president of that company in 1944. He remained in Aruba until September, 1946, when he came to New York to accept a position in the foreign refining department of the Standard Oil Co. (N. J.)

H. E. HANSON, general manager of sales of Standard Oil Company (Indiana) and a director, retired September 8 after 38 years of service. He was succeeded in the sales position by R. F. Baity, his former assistant. Joseph K. Roberts, general manager of research, was elected to the vacant seat on the board.

Mr. Hanson joined Standard Oil in 1909 as a stenographer at Des Moines, Iowa. He came to Chicago as an assistant general manager in 1937, was elected to the board Jan. 1, 1944, and became general manager of sales Jan. 1, 1945.

The new director, Mr. Roberts, entered the Standard of Indiana laboratories Dec. 1, 1928, as a group leader in the research department and was promoted to assistant director in 1935. When he was made director of research in 1938, at 33 years of age, he was one of the youngest men ever to head a large scientific organization.

Mr. Baity's elevation to general manager of sales follows quickly on his election to the board, which was announced June 20 this year. He is the first Indiana Standard executive to become part of the top management from a beginning as a service station attendant, having joined the company in 1920 as an attendant in an Indianapolis station.

S. W. SELFRIDGE has been appointed assistant treasurer and tax agent by Standard Oil Co. of California, succeeding Rudolph Miller, deceased. He was formerly assistant manager of the real estate and right of way department.

EDWARD F. EVERETT, JR., has joined the Marshall-Moorman Development Company, specialists in new applications of fluid catalyst technique. He formerly was a chemical process engineer with the M. W. Kellogg Company.

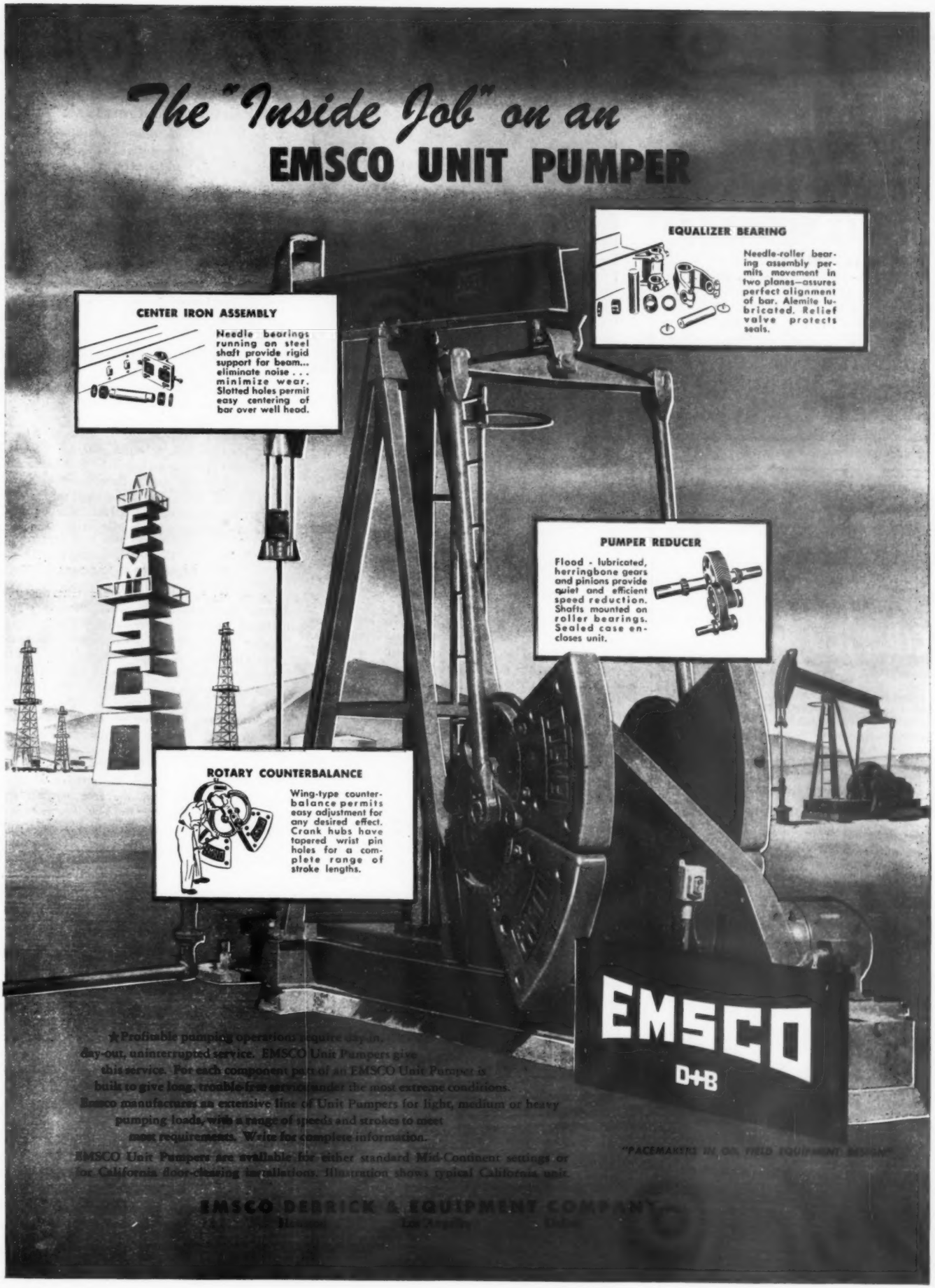
DR. E. S. MERRIAM of Marietta, Ohio, consultant for the natural gas industry, has joined the faculty of the Marietta College School of Petroleum on a part-time basis. He will teach courses in engineering materials and gas production, distribution and utilization.

BYRNES MACDONALD'S appointment as Assistant Director of Public Relations for Sinclair Oil Corporation and its subsidiaries has been announced by President H. F. Sinclair. He will also act in the same capacity as to advertising.

Mr. MacDonald joined the Sinclair organization in 1946 as executive assistant to the president. He is a veteran of World War II, having served as a flag officer on the U.S.S. Essex in the Pacific. He retired from the Navy as a Lieutenant Commander.

Born in 1908, the son of Papal Marquis George MacDonald of New York, he attended the Hill School, and was graduated from Princeton University. In 1912 he joined the staff of the National Recovery Administration in New York. He later served as Deputy Police Commissioner of the city and founded the Police Athletic League in 1936. He was first Deputy Commissioner in the Department of Welfare in 1938, and was Secretary to Mayor LaGuardia from 1940 until he joined the services.

Byrnes MacDonald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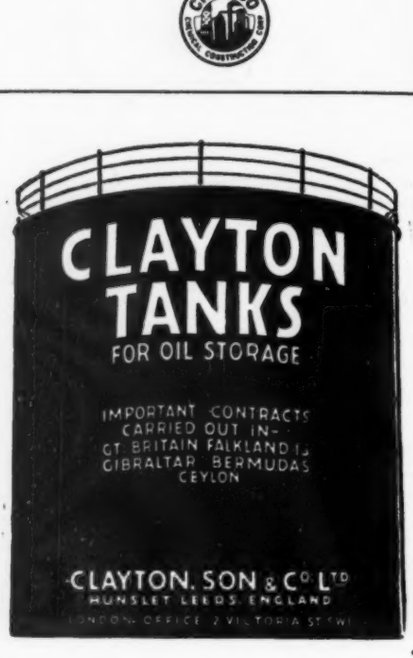

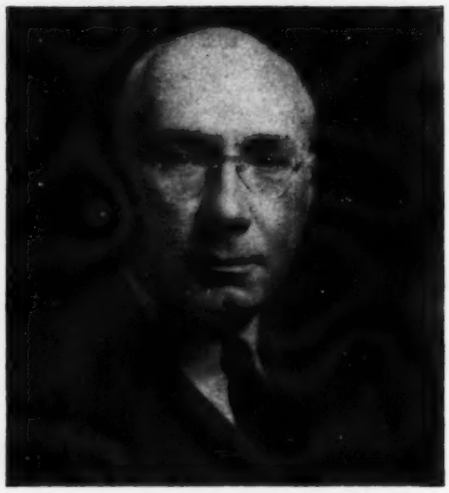

R. M. Bartlett

R. M. BARTLETT has been elected vice president in charge of fuel oil sales and H. P. Hobart, vice president in charge of lubricating oil sales for Gulf Oil Corp.

Mr. Bartlett's experience in the oil industry began in 1923 when he became associated with the Caddo Central Oil & Refining Co. at Shreveport. He joined Gulf in 1926 as assistant to the vice president in charge of fuel oil sales. In 1933 he was promoted to manager of the fuel oil department and the following year was named general manager of fuel oil sales.

Mr. Hobart joined the Gulf Companies in 1919 as assistant to the general manager of wholesale sales. On January 1, 1920, he was appointed manager of Gulf's lubricating sales department and on January 1, 1930, he was appointed general manager of lubricating sales. During his 28 years with Gulf, Mr. Hobart has been very active in petroleum association activities. Among his various offices he currently is chairman of the lubricating committee of the American Petroleum Institute, president of the National Lubricating Grease Institute and a trustee of the National Petroleum Association.

Composite Catalog

Fourteen companies making up Dresser Industries, Inc., have combined to issue a composite catalog of their products. The catalog is a beautifully-designed, 112-page book describing the drilling, pipeline, natural gas and natural gasoline, pumping and storage equipment produced. All of the Dresser companies, except the Bryant Heater Co., and the Day and Night Manufacturing Co., specialize in equipment for the oil industry.

Reinstates Ni-Resist Gate Valves

Crane Co., Chicago, has reinstated its line of Ni-Resist cast iron gate valves, which was discontinued prior to the war. The strength and physical characteristics of Ni-Resist are about the same as those of cast iron; but resistance to corrosion, erosion and war is superior. To add to their corrosion resistance, the stem and body seat rings, the disc in sizes three-inch and smaller, and the disc facings in sizes four-inch and larger are made of Crane 18-18 alloy steel.

Cited As Distinguished Alumnus

Dr. M. M. Leighton, for the past 24 years chief of the State Geological Survey of Urbana, Illinois, was cited by the State University of Iowa at its recent commencement as a "Distinguished Alumnus" in recognition "of his eminence in his chosen field of geology and of his contributions to the public welfare."

Dr. Leighton received his Bachelor of Arts degree from Iowa in 1912, at which time he won the Frank O. Lowden prize in geology. In 1913 he received the Master of Science degree from his alma mater, and in 1916 the Doctor of Philosophy degree from the University of Chicago. His recent citation was made at Iowa's centennial celebration of its founding.

New Steel Process

The M. W. Kellogg Company has developed a new process for making alloy steels which was perfected through 12 years of research. The metallurgical process is an electric ingot method for continuous metal casting. Alloying elements are continuously fed at a controlled rate into an electrical apparatus from which air is excluded and in which an ingot of any desired analysis is produced by progressive solidification. Ingots are being made from six inches to six feet in length although any desired length may be made.

The accuracy with which the alloying elements are metered, combined with the fact that the ingot is progressively solidified in the same container in which the raw materials are melted, provides not only uniformity of chemical analysis but also uniformity of physical properties. The usual transfer of hot metal from ladle to mold which might give rise to non-uniformity of product is eliminated. The uniformity is obtained not only within an individual ingot but also is carried over from ingot to ingot.

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Edwin S. Webster

Celebrates Eightieth Birthday

Edwin S. Webster, who in 1889 was one of the co-founders of the engineering firm of Stone & Webster, celebrated his 80th birthday on August 28. He organized the firm together with the late Charles A. Stone, a close friend and classmate.

At the outset, the firm was engaged in electrical engineering. Operations were expanded later to include genral dsign, ngineering and construction work. Construction and engineering work alone has aggregated more than $2,000,000,000 since the company's formation in 1889.

Mr. Webster served as president and for many years as vice chairman of the board of Stone & Webster, Incorporated, and upon the death of Mr. Stone in 1941 he was elected chairman. He retired from this office in November of last year but continues as a director.

New Engineering Firm

James A. Lewis, recently resigned president of Core Laboratories, has organized a new firm to be known as James A. Lewis, Engineering, located at Dallas, Texas. It will reorganize this division and conduct engineering and research activities both for Core Laboratories and for other clients.

Core Laboratories, Inc., under the general managership of W. H. Davison, vice president, will continue to operate as a service organization for core analysis, reservoir fluid analysis, well sampling and new procedures and techniques including drill cuttings analysis and others to be announced.

Sohio Awards Contract

Catalytic Construction Co., subsidiary of Houdry Process Corp., has contracted for a case repair and catalyst-change for Standard Oil Company of Ohio. The Houdry unit which went on stream June, 1944, is a 20,000-barrel-a-day catalytic cracker, consisting of nine reactor cases, at Standard's No. 1 Cleveland refinery.

Continue Corrosion Research

The Pennsylvania Grade Crude Oil Association has extended to June 30, 1948, its cooperative research agreements with Battelle Memorial Institute of Columbus, Ohio, and the U. S. Bureau of Mines. The Institute is studying corrosion of oil field equipment in secondary recovery operations.

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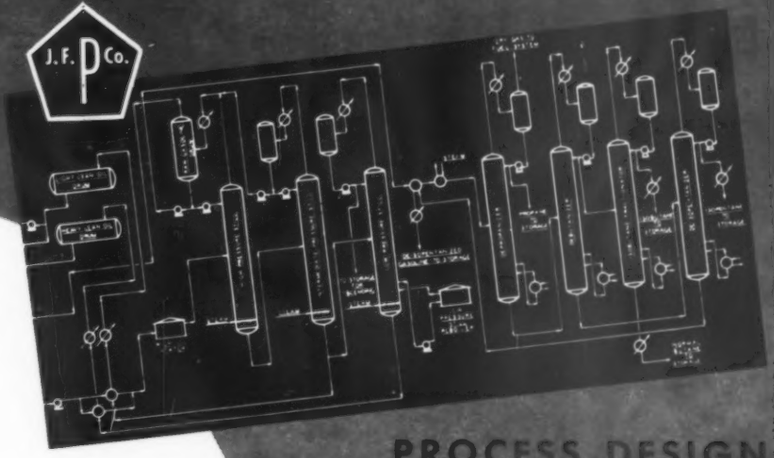

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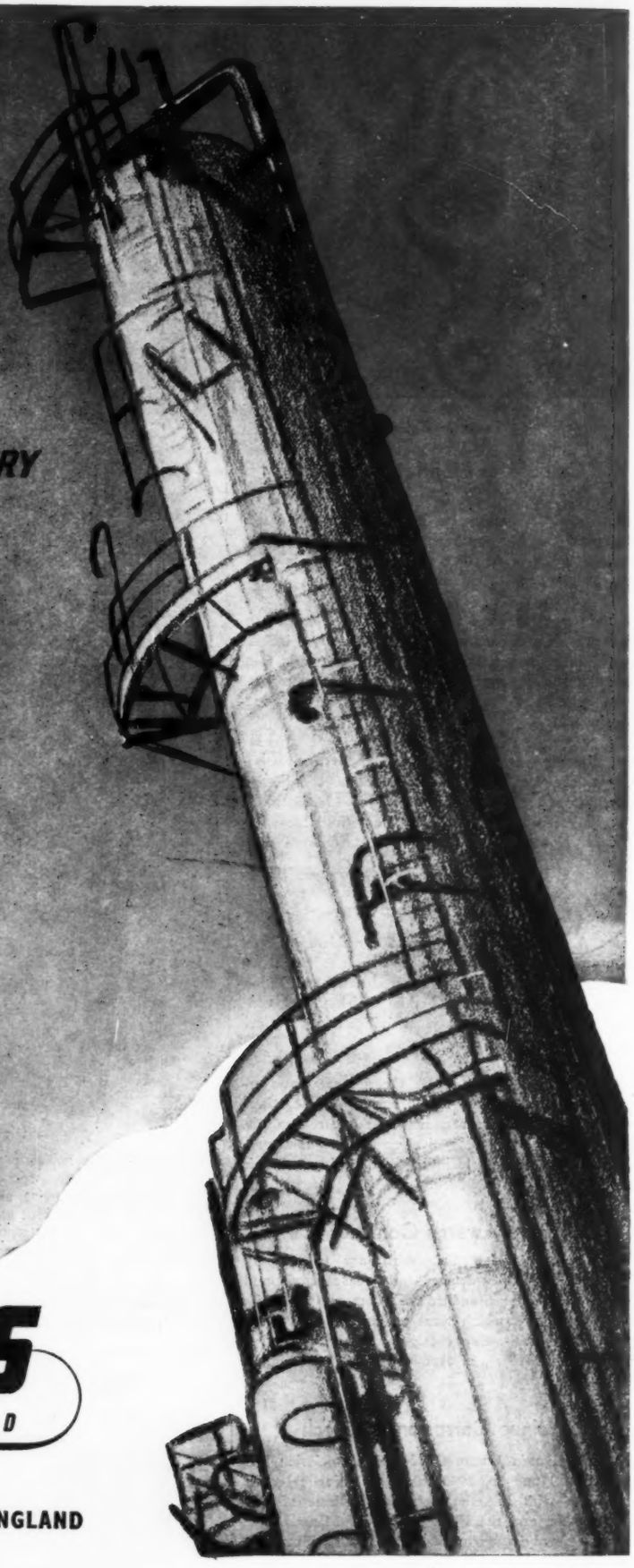

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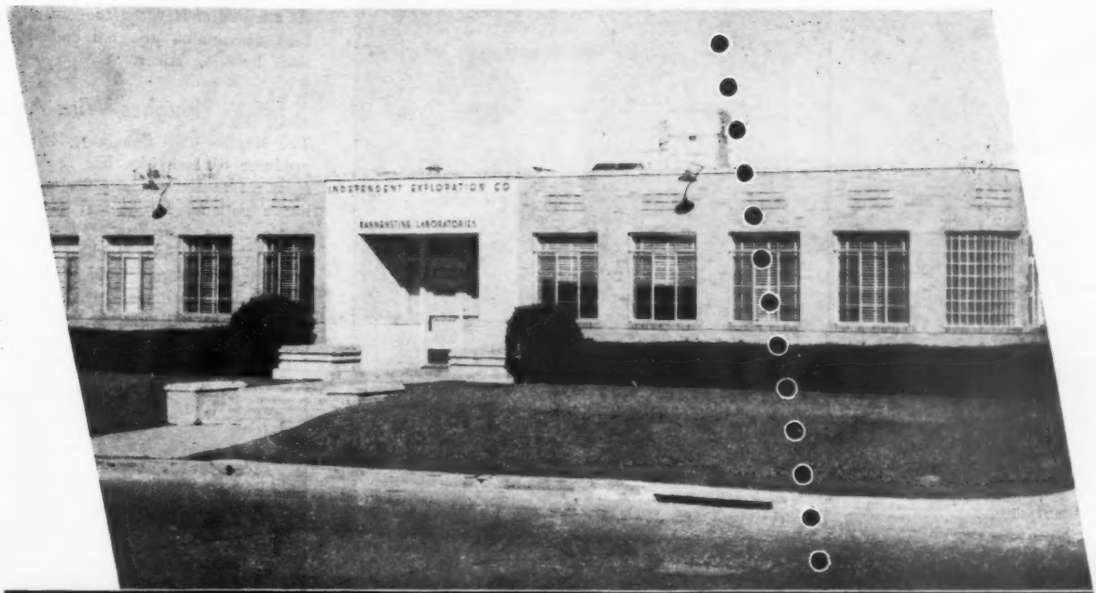

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K. H. Crandall left, and H. C. Teasdel

K. H. CRANDALL has been elected vice chairman of the board of The California Co. a new position in the company. He is succeeded as president by H. C. Teasdel who formerly was vice president and administrative assistant to the president. Both men have been associated with the California Standard interests for the past twenty-odd years.

Mr. Crandall joined the company as an assistant geologist in 1925 following his graduation from Stanford. He did geological work for the company in the Rocky Mountain and plains states and in Texas until 1935 when he was placed in charge of the company's first seismograph party in Louisiana. In 1941 he was made superintendent of exploration and a year later was elected vice president and a director. He was elected president of The California Co. in 1945.

Mr. Teasdel joined Standard of California in 1920 after his war service in the Navy. He was an accountant at San Francisco with the parent company and various subsidiaries until his election as secretary-treasurer of The California Co. Subsequently he was made vice president and a director.

Captain John Lucey

Capt. John F. Lucey, 72, of Dallas, Texas, died in a hospital in Boston on October 8. He had been engaged in the international oil industry since 1900 after his service in the Spanish-American war. He organized a drilling company which operated in California, Texas and many foreign countries. He drilled the first well on the island of Trinidad. Other foreign operations were conducted in Mexico, Argentina, India, Romania, Russia, Spain and other countries. He was in Romania when World War I broke out. As a friend of Herbert Hoover he aided in the Belgian food distribution program and was honored for his work by King Albert.

Hughes Wins Award

The Hughes Tool Company, Houston, world's largest producer of rock bits, has received a safety award from the Steel Founders' Society of America following a national safety contest sponsored by the society's safety committee. The award was presented to M. W. Williams, Hughes Tool foundry manager, at the fall meeting of the society at the Wardham Park Hotel, Washington, D. C. The Hughes foundry did not have a single accident during the period of the contest and for almost three months previous.

R. S. Hatch

R. S. HATCH has been appointed manager of manufacturing and processing for the Arabian American Oil Company. Mr. Hatch was graduated from Massachusetts Institute of Technology in 1927. He joined The Texas Company the same year and has held various positions in the refining and refining-engineering departments. During World War II he served as chairman of the materials subcommittee for District One of the Petroleum Industry Committee, and since January, 1946, has been manager of The Texas Company's purchasing department.

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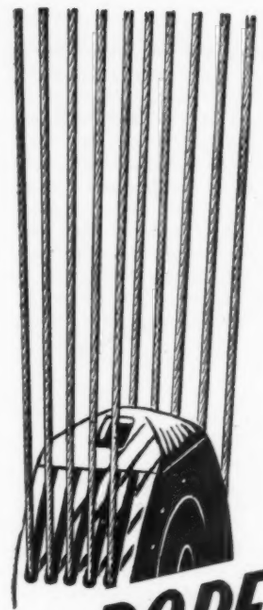

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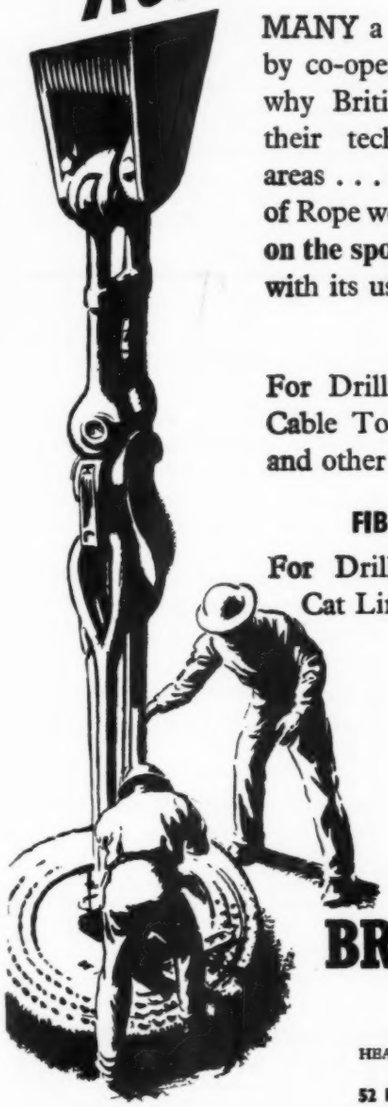

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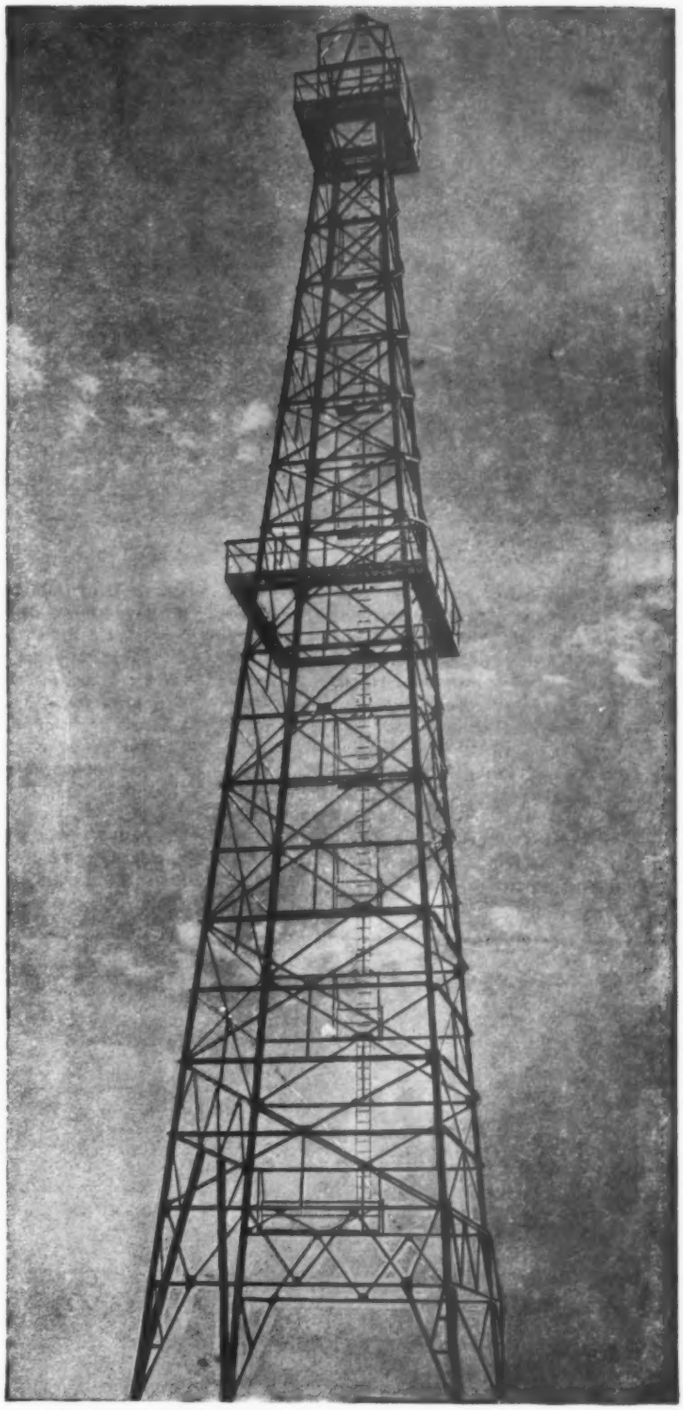

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A. W. Bourne, Jr.

H. W. McCobb

A. W. BOURNE, JR., and H. W. McCobb have been elected directors of Standard-Vacuum Oil Company. Mr. Bourne, a veteran of 32 years' oil industry experience, had been general manager of the company's China division, while Mr. McCobb, who has been in the business an even 20 years, steps up from his job as head of producing operations.

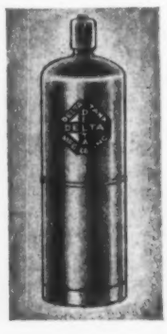
Mr. Bourne started in the oil business in 1915. Trained as a marketing assistant, he was assigned to Batavia in 1916. Later he was transferred to Singapore where he became manager. He represented Standard-Vacuum in London in 1936 but returned to the Far East three years later to become general manager in charge of the company's operations in South China, the Philippines, Malaya, Indo-China, Siam and the Netherlands Indies. He was in Hong Kong when the war with Japan broke out and was interned at Stanley Camp for six months. Repatriated on the Gripsholm in 1942 in the first exchange of war prisoners, he handled postwar planning for Standard-Vacuum for the rest of the war period. In 1945 he returned to Shanghai as general manager of the China division.

Mr. McCobb went to work for Tropical Oil Company as a junior geologist in the oilfields in Colombia in 1927. Transferred to producing in 1928, he became superintendent of production in 1931. Joining Standard-Vacuum in 1934, the year after it was formed, Mr. McCobb was sent to the Netherlands Indies as field superintendent for Nederlandsche Koloniale Petroleum Maatschappij. He became Indies manager of the company's producing operations three years later. At the time of the Japanese invasion of the Indies in 1942, he succeeded in getting out of the Indies to Australia, where he was commissioned as a major in the Quartermaster's Corps to do petroleum supply work in the Southwest Pacific. By the end of the same year he had been promoted to lieutenant colonel and ordered to North Africa as Atlantic Base Petroleum Officer.

In 1943 Mr. McCobb was ordered to Washington, D. C., to serve with the Army-Navy Petroleum Board and later became its deputy executive officer. In September, 1944, he was promoted to the rank of colonel. For his war services Mr. McCobb received the Legion of Merit. Immediately after the war, Mr. McCobb returned to the Indies and assisted in the work of rehabilitation of Standard-Vacuum personnel who had been interned in Japanese prison camps in that area. He was made head of producing operations at the New York office in 1946 and will continue to supervise that phase of the company's work as a director.

James Sim

James Sim, chief draftsman for G. & J. Weir, Ltd., Cathcart, Glasgow, died suddenly on October 20. He had been a member of the Weir staff of engineers since 1908 during which time he developed and patented many steam plant improvements. He was author of the "Steam Condensing Plant," a recognized text, and his appeared on engineering programs in the United States and the United Kingdom.



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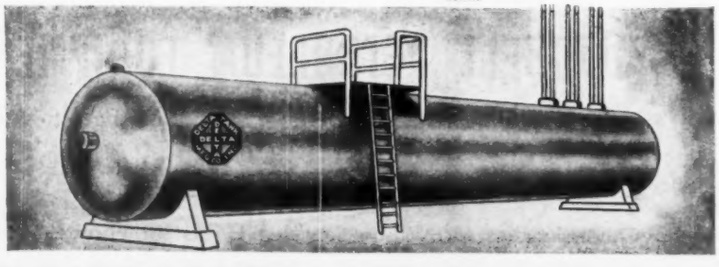
100 lbs. Propane Capacity
Water Capacity 238 lbs.
at 60°F. 14½" I.D. by
52" Lgth.—wt. 90 lbs.—
I.C.C. 4B240

Model PC - 100
100 lbs. Propane Capacity
Water Capacity 239 lbs.
at 60°F.
14½" I.D. by 52" Lgth.
—wt. 90 lbs. — I.C.C.
4B240

Model RH - 420
420 lbs. Propane Capacity
Water Capacity 1000 lbs. at 60°F.
29" I.D. by 56" Lgth.—wt. 420 lbs.—I.C.C.
4B240



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Introduces New Gas Trap

A floatless separator or gas trap, the Autotrol, has been developed by the Baroid Specialties Department after four years of research. The system has no stuffing box and no moving parts within the tank. Differential pressure of the gas and oil within the tank, acting upon an enclosed diaphragm outside the tank, actuates the dual valves controlling the flow of separated oil and gas.

The easily accessible mechanism consists of two valves directly connected to each other by a single stem operated by an intervening diaphragm. Pilot lines from the oil and gas outlets lead to the lower and upper sections. When the liquid in the shell rises to a level a few inches above the level of the diaphragm, the oil valve opens completely and the gas valve closes. Back-pressure regulators are not needed because the gas discharge valve automatically controls the pressure within the tank, thereby forcing the oil into the oil gathering lines. The oil inlet provides an effective means of handling foaming oil since the incoming oil falls directly on the surface of the oil within the shell, thereby continually breaking down the bubbles of foam.

Completes Products Line

The Sinclair Refining Company has completed its products pipeline connecting the refineries at East Chicago, Ind., and Marcus Hook, Pa. The line, originally built in the east from Marcus Hook refinery to Steubenville, Ohio, with an extension to Washington, D. C., and Baltimore, Md., and in the west from the East Chicago refinery to Toledo, Ohio, has been extended northward to Detroit, southward to Columbus and eastward from Marion to Akron and Youngstown. An extension from Akron to Cleveland is being laid. The line now completed from Youngstown to Steubenville links together the entire system. Between Steubenville and Toledo the line is equippd to pump products ast or west.

Heads Trade Association

Robert F. Carter, general construction superintendent of The Lummus Company, New York, has recently been elected vice president of the National Constructors Association.

Mr. Carter was in the engineering business as a consultant and in construction work prior to his coming with The Lummus Company. While with Lummus he has been operator, job engineer and superintendent on both domestic and foreign work. He has recently been made general construction superintendent, in which capacity he has charge of all construction work for the company.

Drum Reconditioning

A new electro-hydraulic chime straightening machine has been developed by L. M. Gilbert Co., Philadelphia, for use in reconditioning steel drums by the oil industry. In one operation the machine will straighten the chime and with hydraulic pressure compress and roll the chime to prevent leakage. By adding a cutting wheel the chime can be straightened and the head or bottom cleanly sheared away. Operating time is less than a minute per drum compared with about an hour and a quater on the average for hand straightening and welding.

Appoints Chief Chemist

Joe Larkin has been appointed chief chemist in charge of rubber research for Patterson-Ballagh division of Byron Jackson Co., manufacturers of oil field rubber specialties. Mr. Larkin graduated from U.C.L.A. as a specialist in organic and bio-chemistry. During the war he was assigned to research for the War Department. Mr. Larkin has achieved numerous outstanding successes in developing special rubber for various industries and will shortly announce the perfection of several new PBX special formulas designed especially for oil field use.

Welcome **to the 27th Annual Meeting of the American Petroleum Institute**

Once again we're delighted to welcome you to Chicago. Please accept our best wishes for a pleasant visit and a successful convention.

STANDARD OIL COMPANY (Indiana)

API Broadens Field of Activity

(Continued from page 69)

patrick, Arkansas Fuel Oil Co., Shreveport; 1st Vice Chairman J. T. Reynolds, Sohio Petroleum Co., Shreveport; 2nd Vice Chairman J. T. Cooke, The Carter Oil Co., Shreveport; and Secy-Treas. Ben F. Carter, Union Producing Co., Shreveport.

Permian Basin Chapter: Chairman D. A. Miller, Phillips Petroleum Co., Midland; 1st Vice Chairman R. B. Saxe, Gulf Oil Corp., Odessa; 2nd Vice Chairman F. R. Lovering, Shell Oil Co., Inc., Odessa; 3rd Vice Chairman J. N. Dunlavey, Skelly Oil Co., Hobbs, N. M.; and Secy-Treas. Jay Boxell, Phillips Petroleum Co., Midland.

Before the war the Institute's transportation activities were widely scattered. Railroad transportation matters were handled by the marketing division, and pipeline transportation matters by the production division. Truck transportation matters were handled by the American Trucking Association outside the Institute and marine transportation for the oil industry was handled by an association of steamship owners.

With the employment of James V. Moss and the opening of a Washington office, all transportation activities of the industry have been centered in the transportation division headed by Institute Vice President B. Brewster Jennings of Socony-Vacuum Oil Co. The transportation offices were placed in Washington because a vast amount of the work done is in connection with government agencies such as the Interstate Commerce Commission, Coast Guard and Maritime Commission.

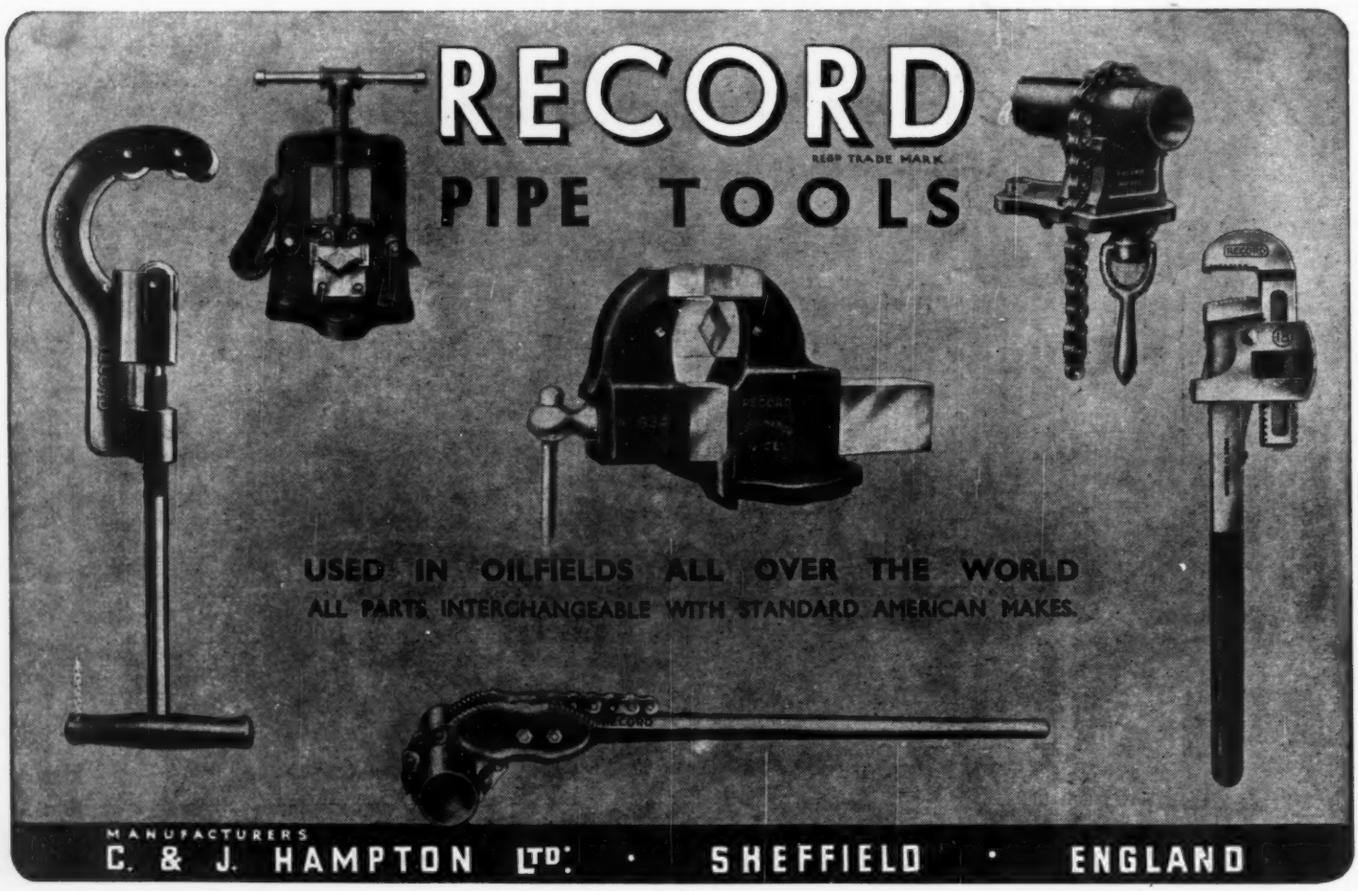
The division embraces five central committees: railroad transportation headed by Fayette B. Dow, Washington; automotive transportation headed by J. W. Sinclair of Union Oil Co. of Calif.; pipelines headed by C. H. Kountz of Sinclair Refining Co.; water headed by H. G. Schad of Atlantic Refining Co., and radio which is a new activity headed temporarily by Mr. Moss.

Each central committee has a group of subcommittees working on specific problems. Railroad transportation subcommittees include legal subjects headed by Mr. Dow; transportation regulations, Harry S. Elkins of the Washington offices of the Institute; railroad equipment, Mr. Moss; car service, B. C. Graves of Union Tank Car Co.; diversion and reconsignment, L. R. Cowles of Standard Oil Co. (Indiana) freight classification, Wm. L. Macatee, The Texas Co.; and measuring and sampling, E. L. Hoffman, Socony-Vacuum Oil Co.

In the automotive section M. E. Nuttila of Cities Service Oil Co. heads the committee on regulations; H. A. McKim, Standard of California, engineering; L. A. Carlson, Gulf Oil Corp., operations; Charles J. Yokom, Refiners Transport & Terminal Corp., bulk hauling; P. H. Kuhns, Continental Oil Co., shipping practices; A. A. Buzzi, Shell Oil Co., uniform shipping papers; G. T. Bodman, Continental Oil Co., uniform calibration of tanks.

The pipeline group has two committees on corrosion. L. F. Scherer, the Texas Pipe Line Co., heads the committee studying external corrosion, and R. A. Brannon of Humble Pipe Line Co., internal. Products pipeline technology subcommittee is headed by A. H. Riney of Phillips Petroleum Co. and the general technology committee is under Chairman H. H. Anderson of Shell Pipe Line Corp. L. S. Wrightsman of Humble is leading a joint API and ASME research committee. Valuation matters are under the general supervision of a committee headed by D. S. Bushnell of the Northern Group of Pipe Lines with an engineers-accountants subcommittee headed by C. M. Rosebrugh of Gulf Refining Co.

Frank W. Miller of Standard Oil Co. (N. J.) is chairman of the corrosion and LPG marine committee. A. S. Angus, The Texas Co., is chairman of the committee on oil polution; H. A.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Gilbert, Oil Transfer Corp., gas hazards; James P. Patterson, Pan American Petroleum & Transport Co., legislation. Mr. Moss of the Institute heads committees on package cargo and tank vessels.

Appointment of E. Earl Lothrop as aviation representative of the American Petroleum Industries Committee points up the greater interest which the Institute has been taking in aviation progress. He will work with the aviation advisory committee of the APIC on matters relating to taxation and legislation involving aviation products.

Another phase of aviation in which the APIC has taken an interest recently is in preserving competition in the sale of aviation gasoline at publicly operated airports. A number of aviation gasoline distributors were disturbed by an apparent tendency on the part of airport authorities to limit gasoline sales to a single supplier and to sell the gasoline concession to the highest bidder. A single supplier system was employed for a time at Washington, D. C.; it was proposed at the Idlewild airport at New York and at the Logan international airport at Boston.

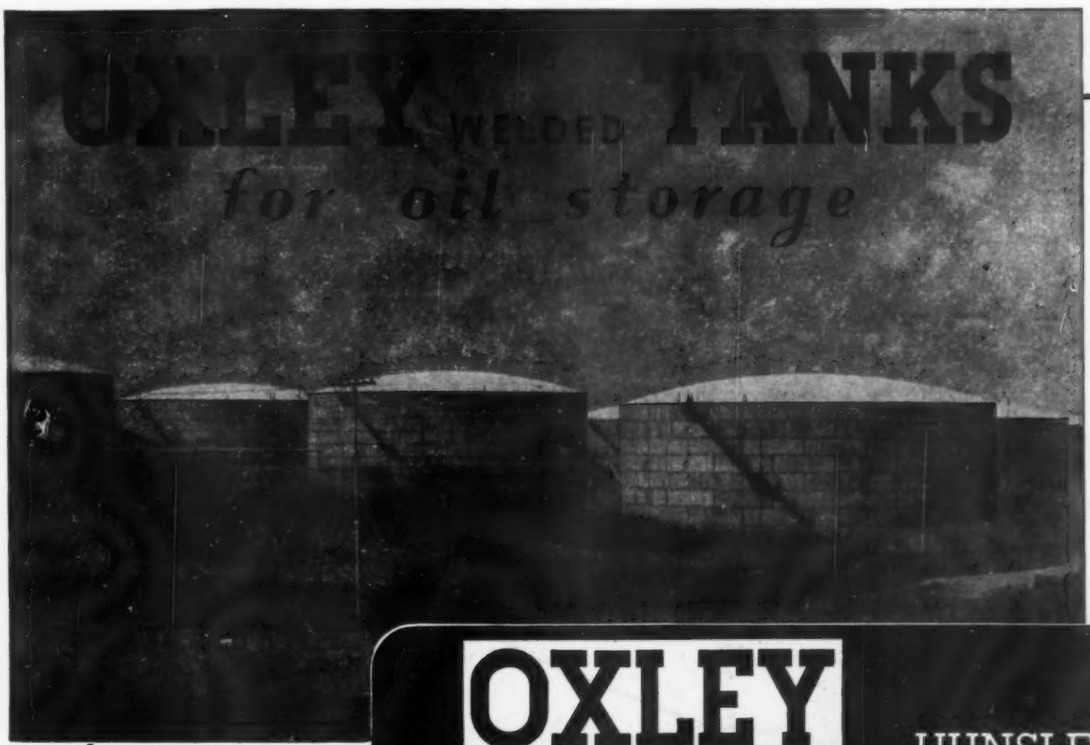
In Boston airport case the committee conducted a survey of installation costs and prepared a brochure in support of the competitive selling of gasoline as being the most satisfactory method from the standpoint of the airlines, the oil industry and the airport itself. The brochure has been presented to airport authorities for their study in connection with plans for the new port.

Distributing lines from storage tanks to the hangar area with proper hydrants and dispensing apparatus was found to be much more costly than the purchase of aviation service trucks for fuel delivery. It was found also that mobile units on the ramps still would be required to give adequate and fast service, even though distribution lines were laid and hydrants installed.

The disadvantages that would result from the installation of a single system with multiple suppliers were outlined by the committee. Such a system would result in the delivery of a mixed product to an airline which had contracted for the specific brand. The burden of guaranteeing fuel purity would be on the airport rather than the supplier. Complete loss of brand identity would destroy any standard for judging individual fuel performance. Incentive to progress in fuel improvement is deadened. A fixed system with a single supplier was considered unadvisable because this limits the buyer's freedom of choice of product. Such limitation may make overall airline operations actually or psychologically difficult. The committee pointed out to the Logan airport authorities also that a successful bidder for a monopolistic airport franchise must necessarily add enough to his selling price to recover cost of the franchise. Tendency thus is for prices to be higher than under the competitive system.

System proposed to Logan was erection of segregated storage tanks with individual truck loading lines. To preserve flexibility of operation particularly in port development stages, recommendation was against pits and hydrants. It was suggested that all fueling trucks be equipped with two pumping systems, meters and hoses, for fueling and defueling. Trucks should have a delivery rate of 100 GPM through each hose. Trucks should be equipped for bottom loading as soon as possible to obtain higher loading rates and prevent fuel aeriation.

With the appointment of Mr. Lothrop as aviation representative, the APIC will be in position to counsel airport authorities on all new installations. He is well equipped to aid since he served as first chairman of the aviation marketing committee of the American Marketing Association, is the author of several aviation surveys. He is a pilot himself and knows the pilot's problems. His experience with Westinghouse in product research and with Sperry Gyroscope Co. as assistant sales manager gives him the airline viewpoint.



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